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ON

LESIONS OF THE VASCULAR SYSTEM, DISEASES OF THE RECTUM,

AND OTHER

SURGICAL COMPLAINTS,

BEING SELECTIONS FROM THE

COLLECTED EDITION OF THE CLINICAL LECTURES

OF

BARON DUPUYTREN

SURGEON-IN-CHIEF TO THE HÔTEL-DIEU AT PARIS.

TRANSLATED AND EDITED BY

F. LE GROS CLARK

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PREFACE.

SHORTLY after the appearance of the former Volume of the 'Leçons Orales' of Professor Dupuytren, which I had the honour of editing for the Sydenham Society, the Council proposed to me to continue the Translation; and a Report was accordingly submitted to them, embodying a classified arrangement of the contents of the remaining Volumes. A considerable time, however, elapsed before the decision of the Council was definitively communicated to me; and the restricted leisure now at my command has further delayed the appearance of the present Volume, and somewhat curtailed it of its proposed dimensions. Indeed, I may add that I have exercised the discretionary power entrusted to me, in omitting certain articles and substituting others, believing that I should, thereby, render my contribution more generally acceptable to the Members of the Society.

As on the former occasion, I have deviated so far from the original text as the abridgment of details and an uniform style required.

The practical utility and tested applicability of the doctrines taught by an acute observer of such rare experience as M. Dupuytren, impart a peculiar value to his writings: the reader must not be surprised, therefore, if he occasionally discover, in perusing this Volume, that the opinions and practice advocated by more recent Authors have been anticipated by the great French Professor.

F. L. G. C.

Spring Gardens;
London, 1854.

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PART I.

LESIONS OF THE VASCULAR SYSTEM.[1]

SECTION I.

OF ANEURISM COMPLICATING FRACTURES, AND FIRE-ARM WOUNDS, AND THEIR TREATMENT.

THE affection of which I am about to treat in the present chapter is one of not infrequent occurrence, and consists in the accompaniment of a fracture or fire-arm wound by laceration of a principal artery and extravasation of blood, possessing the characters of an aneurismal tumour. This serious complication not only compromises the existence of the limb, but threatens the life of the patient; and, according to the practice hitherto adopted, offers but one of two alternatives,—the sacrifice of the injured member by amputation, with all its attendant risks,—or the death of the sufferer. These disastrous results, it has appeared to me, ought not necessarily to be consequent on the complication in question; and I now propose to point out how they may be avoided, by a plan of treatment at once more gentle and more sure.

There is a system of vessels which spring from the heart and terminate in various parts of the system. Their texture is fibrous, thick, and elastic, and their function is to distribute a fluid, suited, by the process of respiration, to stimulate and nourish the structures it supplies: I speak of the arteries and the arterial blood. As long as a healthy equilibrium is maintained between the circulating force and the powers of resistance in the vascular system, the impulse of the heart suffices to propel the blood with momentum enough to dilate and call into play the elastic property of the arteries; but it is incapable of rupturing these vessels, and thereby of producing a fatal effusion of blood. Disturbance of the equilibrium alluded to is the rife cause of a multitude of disorders in the animal economy, which, sooner or later, prove fatal; more speedily, no doubt, where the heart is the seat of the diseased action, but scarcely less surely where the arteries are affected.

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[1] This memoir was read before the Royal Academy of Sciences, in 1825; it is published entire in the 'Leçons Orales.'

Thus, when an artery has lost its tone from some cause or other, and yields at any given part of its course to the impulse of the heart, which propels the blood with undue force, a sanguineous tumour is speedily formed; and this augments with varying rapidity; and, when it bursts, almost inevitably entails a fatal hemorrhage. Again, if an artery is wounded, and the blood poured out around the seat of injury, the tumour which ensues is as likely to prove mortal as in the former case.

The causes of these diseases are numerous and varying. It is unnecessary to enumerate all of these, as it is my especial object to confine myself at present to two which have been almost overlooked by writers, viz., fractures and wounds from fire-arms.

It is easy to conceive how the fragments of a broken bone, or a cannon-ball or other similar projectile, may give rise to the formation of an aneurism, by slowly altering or at once destroying the walls of an artery; and, in reflecting on the frequency of these accidents, it would seem to be a natural inference that this form of aneurism would be by no means rare. Yet there is scarcely a single instance on record; proving that either these cases are really rare, or that the attention of observers has not been directed to them. The only example, indeed, which I have been able to find in ancient or modern literature on the subject, is the following one by J. L. Petit.

Case I.—*Fracture of the Leg. Division of the artery by a fragment of the tibia.*—" In a fracture of the leg, without any external wound, I saw the artery which passes between the two bones (doubtless the anterior tibial) laid open by the sharp edge of the broken tibia. Ecchymosis spread itself over the whole leg and foot; the part became cold and discoloured, and appeared gangrenous. I laid open the leg by an incision of about six inches in length, extending above and below the fracture, and discovering the open vessel, arrested the hemorrhage without displacing the bones; the case was then treated as an ordinary compound fracture. In order to command the bleedings effectually, it is essential to bring into view the bleeding vessel, that immediate compression, the ligature, or styptics, may be successfully employed. These are the three resources at our command, by which to suppress hemorrhage."[1]

Though writers on the subject, since the time of Petit, have not failed to enumerate aneurism as amongst the casualties which may result from fracture, not one of them has cited a fresh example of this serious complication. Even in M. Boyer's work on surgery, the only instance mentioned is one with which I furnished him some fifteen years since.

I anticipated, at the least, being able to meet with some such cases in works on gun-shot wounds; but here, likewise, both in ancient and modern literature, I have been equally disappointed.

Yet, for all this deficiency, the cases are far from rare. I have witnessed as many as seven since 1806; and I have no doubt, now attention has been awakened to the subject, that many more cases will be observed and recorded. It may be that practioners have overlooked this serious complication of fractures and gun-shot wounds, because they regarded it as beyond the ordinary resources of art to cure. Be that as it may, the universal recommendation is to amputate in such cases. Such is the practice I have witnessed in several instances, which were treated by a very able and experienced surgeon. The following are examples in point.

---

[1] Traité des Maladies des Os; Paris, 1736, tome ii, p. 46. It is not stated whether the tumour in question pulsated, or what means were resorted to for arresting the bleeding in this case. The application of a ligature on the femoral artery would have been a more appropriate course here.

CASE II.—*Fracture of the Leg, followed by extravasation of arterial blood. Amputation.*—Jacques Picard, aged 61, of sanguineous temperament, was admitted into the Hôtel-Dieu for an accident which occurred thus. Whilst driving a coach, he was thrown beneath the wheels, one of which passed over both of his legs near the ankles. The left leg was found to have suffered a simple fracture; but the swelling was already too great to put the limb in splints, therefore an evaporating lotion was applied.

The swelling was greater on the following day; and the right leg was also swollen and discoloured near to the ankle. Emollient applications were now substituted, and continued for twelve days. Suppuration then took place over the right foot and lower part of the leg, and the matter was evacuated.

After the lapse of a few more days, the swelling of the left leg the while increasing, fluctuation became manifest here also; the left limb was going on favorably. At the close of the third week, the surgeon-in-chief was tempted to make an incision into the fluctuating tumour of the right or fractured leg; but instead of an abundance of pus, only a very small quantity escaped, together with abundance of clots, followed very speedily by the discharge of florid, arterial blood. The femoral artery was compressed at the groin, by which the hemorrhage was arrested; and amputation was immediately decided upon. This was forthwith performed above the knee, the swelling having already included that joint. The patient made a slow recovery, the bone protruding and requiring resection, some time after the primary amputation.

On examination of the limb, large quantities of clotted blood were found distributed amongst the muscles on the back of the leg, and the arteries were found to be ossified throughout; but, though the limb was successfully injected, the exact source whence the extravasated blood was derived could not be discovered. In the following case this was more evident.

CASE III.—*Fracture of the leg, accompanied by extravasation of blood. Amputation.*—Claude-Gérard Calaz, aged 55, of small stature and feeble power, having the legs bowed forwards, was thrown from a ladder, and broke his left leg, in 1806. When brought to the hospital, it was evident that the left tibia was fractured very obliquely below its upper third, the upper fragment threatening to penetrate the skin. The limb was placed in a favorable condition and position, and for the first week all went on satisfactorily and as usual, with the exception of a considerable tendency to riding of the fractured extremities of the tibia, attributable, apparently, to the curvature of the bones. But towards the end of a fortnight, the patient began to complain of pains in the calf of the leg, which he ascribed to the tightness of the bandages, and experienced relief when they were slackened. After the lapse of a few days, however, the same suffering returned; but, when the limb was examined towards the close of the month, there was no appearance to account for this continued pain. It went on increasing, nevertheless; and in the course of a few days afterwards, swelling, accompanied by tension and a blueish appearance, was evident about the middle of the leg. On further examination, a sort of tremulous movement, increasing and diminishing alternately, became perceptible, such as might have been taken for the pulsation at the ends of the fingers; this was observed on the front as well as the back part of the leg. This swelling, moreover, was observed to diminish a little in volume, and to lose its regular pulsating character, when the popliteal artery was compressed; but all the signs above enumerated were restored when the compression was removed from the artery,—circumstances which left little doubt as to the true nature of the tumour. On prosecuting the examination, the popliteal artery was found to be sound; the inference, therefore, was, that the aneurism was associated with one of the arteries of the leg. It was evident that death must ensue unless some decided step were taken to save the patient; and the alternative of amputating or placing a ligature on the femoral artery held out but little hope, in consequence of his bad constitution and enfeebled state.

The fracture, however, appeared to be almost entirely consolidated, and so the apparatus was removed; but in less than four hours the rapid extension of the swelling determined the question in favour of immediate amputation, preparatory to which an incision into the leg cleared up any remaining doubt

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[illegible] blood escaping by the [illegible] the wound being left [illegible] stage. The next day [illegible] the limb was more [illegible] than on the previous evening. He was bled from the arm.

Each day a large quantity of clots came away; suppuration set in, and in the course of a fortnight was abundant and of a bad character. An abscess formed on the inner side of the leg, which was opened, and pus with decomposed blood evacuated. The accompanying constitutional disturbance was considerable, and the patient's powers daily diminished.

Days and weeks passed by, until between two and three months had elapsed, the patient continuing to lose blood: the limb was then examined, and the fracture found to be united, some loose fragments of bone having separated. His general health was also improving, when suddenly a profuse hemorrhage occurred, accompanied by excessive distension of the leg. The surgeon-in-chief had only just time to compress the femoral artery, and to make an incision along the leg, to try if the introduction of lint would arrest the bleeding. It, however, returned on the following day; amputation was performed, and the man died seventeen days afterwards.

An examination of the limb showed the anterior tibial artery opened in five or six places. Both fractures were united.

I have here narrated three cases of aneurism or extravasation of arterial blood, consequent on fracture, and in which it was thought there was no alternative but amputation of the limb. Nevertheless, this mutilating operation was successful in one only of the three cases. It would, therefore, seem that, apart from the maiming nature of the remedy here adopted, the danger of the operation itself is another and grave reason for avoiding it if possible; for, even in favorable cases, scarcely less than a fourth part of all amputations of the limbs terminate fatally.

We should never lose sight of the importance of preserving whilst we are curing,—a principle which is well illustrated in the history of the treatment of aneurisms. These cases were formerly allowed to run their course and terminate by fatal hemorrhage; or amputation was practised, whereby the patient was not only subjected to a distressing mutilation, but was exposed to all the additional risks attaching to the operation itself.

The discovery of the circulation by Harvey, and the employment of the ligature to arrest hemorrhage by Ambroise Paré, afforded the necessary information, and its application in the cure of aneurisms; and this speedily led to the substitution of the ligature for amputation in the treatment of this disease. It seems, therefore, strange, that the peculiar form of aneurism of which I am now treating, should be regarded as curable only by amputation. As a reference to facts alone can prove the validity of this conclusion, I proceed to narrate some cases in point.

CASE I.—*Fracture of the leg, accompanied by wound of one of the arteries.*—[illegible] Marie Barbe, a female, aged 62, of spare habit, but enjoying pretty good health, slipped and fell while crossing the street, in January 1839. She felt pain, and was sensible of a snap at the lower part of her leg at the time of the accident. On the following day she was brought to the Hôtel-Dieu, and I at once ascertained that both bones of the leg were broken at the junction of the middle and inferior thirds. The fracture was oblique, and accompanied by displacement of the fragments forwards and backwards: there was likewise great swelling and tension of the surrounding soft parts. On attempting the reduction, I felt at the back part of the leg, in the calf, diffused but strong pulsation, distinct to the eye as well as to the touch, and synchronous with the heart's action; this was controlled when pressure was made on the femoral artery, but returned as soon as it was removed. There could, therefore, exist no doubt as to the real and serious nature of the case, which was evidently one presenting the complication of an artery wounded by the fractured extremity of one of the bones, either at the time of the accident, or subsequently in moving the patient; and I inferred from the position of the extravasation, that the posterior tibial was the vessel lacerated; and that the lower fragment of the tibia, which projected backwards, had produced the mischief. As the circumstances of the case did not call for immediate interference, and its nature was such as to demand reflection, I determined to defer taking any step until the evening.

What was I to do? The age of the patient was against her: but was she to be abandoned to her fate, without an attempt to save her?

Should I adopt the practice of J. L. Petit, and cut down upon the wounded artery and tie its bleeding extremities? The difficulties of such a search at the bottom of a deep incision through the muscles, and in the midst of soft parts nfounded together by a mass of extravasated blood, restrained from acting on this suggestion. Supposing even that I ceeded in securing the bleeding vessel, the operation itself would expose the patient to all the perils attending the exposure of a large cavity filled with blood, in direct communication with the fractured extremities of the bones; to say nothing of the consequent difficulties and hazard associated with the dressing of such a wound.

One other alternative presented itself, viz.: that of amputation through the thigh. This certainly had the merit of being a simple and expeditious mode of extrication from the difficulty. But, apart from the distressing mutilation which such a proceeding would entail on the patient, even if she recovered, I could not but be mindful of the fatal result which had attended a similar step in several cases analogous to the present.

The preferable course seemed to be the application of a ligature on the main artery of the limb at a distance from the seat of mischief. This would arrest further bleeding from the lacerated artery, and allow time for it to close. It would further supersede the necessity for laying open the large sac containing the extravasated blood in the neighbourhood of the fracture, and exposing it to the risk of inflammation and dangerous suppuration. This, then, seemed to me to be a reasonable step; but I had neither precedent nor experience to guide me with regard to its safety. I feared that the obstruction to the circulation might induce gangrene; or, on the other hand, that the too speedy restoration of the blood to its natural course through collateral channels might render the attempt useless: or, again, that the irritation set up by the fragments of the broken bones and the presence of the effused blood, might be succeeded by inflammation and suppuration. I resolved, however, to make the attempt of tying the femoral artery in the middle of the thigh; and this operation was accordingly performed with unusual facility. A triple ligature was carried round the vessel, and tightened, with the effect of immediately arresting all further pulsation in the tumour.

I was gratified to find that neither the temperature nor sensibility of the limb were in the least interfered with. On the fifth day, the anastomotic branches around the knee could be both seen and felt. On the sixth day, the tumour was reduced one third in bulk, and continued to diminish pro-

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and spots of ecchymosis had made their appearance at various parts, even to above the knee. Acting on the precedent afforded by the successful case already related, the femoral artery was tied towards the upper part of the thigh. The ligature was cut close to the knot, and the edges of the wound approximated throughout. The patient complained first of numbness in the limb, and subsequently of a feeling of cold, but the temperature of the foot was natural.

Through the day, the patient was thirsty, with a full, hard, and quick pulse; complained of acute pain in the heel. Bled to 12 ounces. Had a restless night.

On the following day he was better, and the swelling of the leg had somewhat diminished. The colour of the skin was also improved, and no pulsation could be detected in the swelling. The limb retained its normal temperature, and there was less numbness. On the fourth day, a few vesications appeared, but the cutis beneath was sound.

On the tenth day, the wound in the thigh was almost entirely healed. On the twenty-fifth day, it opened again, to allow the exit of the ligature; the union of the fractured bones was going on satisfactorily. At the end of three months the patient walked about without crutches; and, though there was some little difference in the volume of the two limbs, there was not the least deformity."

The conclusion to be drawn from these two cases seems obvious,—viz., that such an injury as was inflicted in each is curable by ligature of the main artery higher up; and that even when the laceration of the artery is accompanied by an aneurismal swelling.

In both of the above instances the skin was uninjured. It may, therefore, still be a question whether the same practice would be applicable where the fracture is compound. Judging from the ordinary consequences of such fractures, unaccompanied by arterial lesion, I cannot but infer that the issue would be as satisfactory.

It now remains for me to point out, that fire-arm wounds, complicated with aneurism, do not call for amputation, any more than fractures accompanied by similar vascular lesion; and that, in like manner, they may be cured by the application of a ligature on the main artery of the limb. This I shall prove, as in the former instance, by the narration of cases.

CASE VII.—*Gun-shot wound, accompanied by division of one of the arteries of the leg.*—M. De Gombaut, aide-de-camp to a distinguished lieutenant-general, received a pistol-ball through the upper part of his right leg, in February 1818. It passed from before, backwards and inwards, traversing the interosseous space, and slightly injuring the tibia and fibula in its passage.

Severe hemorrhage immediately ensued, blood pouring forth abundantly from both apertures which the ball had made. This was temporarily arrested by compresses, and the patient was removed home.

The leg swelled and became, first, acutely painful, and afterwards alarmingly benumbed; nevertheless, the limb retained its vitality. There was no external hemorrhage until the thirteenth day; but in the interval blood was extravasated, so as to form an aneurismal swelling which increased day by day, and evinced its true character by the pulsations in it which were synchronous with those of the heart.

The tourniquet of Petit arrested the pulsation in the tumour each time that it was applied over the femoral artery, or when it was tightened. But after a time, as is generally the case, the column of blood worked a passage for itself under the compress, either by raising it or separating the soft parts; and at length hemorrhage took place on the thirteenth day from the receipt of the wound. This was renewed at intervals, and greatly reduced the patient.

It was at this time that I was called in to see the patient. The foot and leg were tumid, purple, cold, and numbed. At the upper part of the leg was a tense tumour, which expanded and contracted with each beat of the heart. Over this swelling were the two openings, one in front, the other behind, made by the ball at its entrance and exit. These apertures had been for the last few hours closed by plugs of coagulated blood, which each pulsation threatened to dislodge. The tourniquet, which was still applied, served only to moderate the force of the current of blood. It was evident from the history, as well as all the past and present symptoms of the case, that the ball had cut through one or more of the large arterial trunks in the leg.

What was to be done? To do nothing would be equivalent to abandoning the patient to speedy and certain death from hemorrhage. The employment of pressure had failed; should an attempt be made to tie the bleeding vessels at the seat of injury? This seemed impracticable, inasmuch as it was impossible to decide what vessel required a ligature, whether to cut down through the front or back of the limb, or whether the bleeding might not proceed from more than one trunk. Moreover, these operations on the arteries of the leg are not easy under favorable circumstances; and in the present instance, where the surrounding parts were so broken up and disorganized, such a proceeding may be fairly deemed impracticable. Amputation seemed to be the most prompt and certain remedy. But this operation is, in itself, by no means devoid of danger; indeed, if I can depend on statistics in my possession, at least one fourth part of the individuals subjected to this mutilation perish, even among the young and vigorous, such as war selects for its victims on the field of battle. I rejected this alternative; and fortified by my previous success, and for the reasons detailed in case V, I decided on giving the preference to tying the femoral artery. Moreover, I had the satisfaction of feeling that, in case I was disappointed in the anticipated effect of a ligature on the main trunk of the limb, I could still proceed to the completion of the amputation, of which the step I was about to undertake might then be regarded as the first stage.

The artery was accordingly tied in the middle of the thigh with a single ligature; an assistant, meanwhile, commanding the vessels at the groin. Before tightening the ligature, I ascertained that pressure on the exposed artery entirely arrested the pulsation in the tumour. The wound being simply dressed, the limb was semiflexed and laid on its outer side, resting on a pillow; the aneurismal swelling was enveloped in compresses dipped in strong lead wash, and the rest of the leg and foot was surrounded by warm clothing.

The operation was simple and soon completed. It is but a trifling merit to acquit one's self well in this the mechanical part of our profession; but the most consummate art is insufficient to ensure success and guard against accidental circumstances which may arise in the after-treatment. Gangrene may ensue from the circulation failing to be re-established; or the collateral circulation might too speedily carry the blood onwards, and so lead to further hemorrhage; or, at a later period, inflammation, suppuration, decomposition of the extravasated blood might induce a fatal termination.

I cannot say that I much dreaded a deficiency of circulation in the limb, as the patient was young and vigorous. As to the risk of hemorrhage, arising from too speedy restoration of the circulation, I trusted that the inflammation which necessarily followed the division of the lacerated vessels, and the presence of the extravasated blood, would operate as a safeguard against its return. Any accidental consequences resulting from inflammation, suppuration, &c., must of course be met and treated according to circumstances; and if amputation were, after all, required, this last resource was still in our power.

Our fears proved groundless, and our hopes were realized; for the natural functions of the limb, dependent on a sufficient supply of blood, were not for a moment interrupted. There was but a moderate amount of inflammation; the extravasated blood was removed by a gentle suppurative action, or escaped by the wounds, and that which was infiltrated was gradually absorbed. The general treatment was limited to the employmen of antispasmodic medicines to quiet the nervous system in the first instance, and a cautious diet; appropriate dressings were employed according to the varying condition of the limb.

The ligature separated from the artery on the twentieth day. The condition of the leg improved. The suppurative process brought away, in the course of time, some fragments of bone, and pieces of dress, which escaped by the back wound. At the end of six weeks the wounds were closed; and in three months from the receipt of the injury M. de Gombaut walked as well as before he was wounded.

It seems to me to be a just inference that the successful termination of this case is attributable to the step which was taken in cutting off the course of the blood through the divided vessel, and thus allowing time for the healing of the lacerated openings in it, before the re-establishment of the circulation by collateral branches. And, if we may judge by analogy, the obliteration of a vessel wounded by a gun-shot ought to take place more speedily than when the wound is inflicted in any other way.

I may venture to conclude this paper by remarking that the two forms of complicated injury which I have illustrated in the preceding pages, viz. arterial lesion accompanying fracture or fire-arm wound, have hitherto been considered remediable only by amputation. It occurred to me that this mutilation might be obviated by placing a ligature on the principal artery of the limb, at a distance from the seat of injury. Success has attended the experiment in the hands of others as well as myself; and I trust that, as the operation becomes more known and appreciated, more limbs will be saved by this course of proceeding.

SECTION II.

ON SYMPTOMATIC GANGRENE CONSEQUENT ON ARTERITIS.

The varieties of gangrene, to which the epithets "spontaneous, senile, dry," &c., have been severally assigned, have hitherto been studied almost exclusively with reference to their external characters. Moreover, practitioners have kept in view the necessity of arresting the gangrene by topical applications, and procuring the separation of the affected parts, without directing their attention to other and more general measures. Struck with the obscurity which involved this disease, I endeavoured to throw some light upon it by the aid of pathological anatomy, and was soon convinced that although the cause had been overlooked, it nevertheless existed, and was often to be discovered in inflammation if the principal arteries of the parts affected, which presented a reddened appearance, with the blood coagulated in them and blocking their canals so as completely to arrest the flow of blood through them. The coagulation may arise in different ways; either by the contact of the blood with the inflamed membrane, or by mixing with coagulable lymph, or by ulceration of the artery. Examination after death has proved the existence of all these conditions. When amputation has been performed for an affection of this nature, the vessels are so filled with fibrinous clots, or a mixture of fibrin and pus, as to prevent the blood from escaping, and to supersede the application of ligatures.

The etiology of symptomatic gangrene has been misunderstood until recently. Old age and feebleness were regarded as the chief cause of the disease; but this explanation cannot be admitted, as it has been known to attack the young and middle-aged also. Ossification of the arteries, again, has been regarded as a potential cause of this condition; but investigation proves that this change of structure is often nothing more than simple coincidence and that in some instances it is even the consequence of arteritis. Indeed, ossification alone of an artery is insufficient to retard, in any very appreciable degree, the course of the blood through it. How often are limbs dissected in which all the arteries are ossified, and yet there had been no senile gangrene: and it must have occurred to every surgeon, when amputating or operating for aneurism on an old patient, to find one or more arteries in a limb entirely ossified, and yet the circulation has been as free as if no such lesion existed. Ossification alone is an insufficient explanation; it is the obliteration of the arterial trunks, and the arrest of the flow of blood through them which is the true cause of this malady; and this leads me to the consideration of the question, how this obliteration is brought about.

In investigating the cases of individuals who are subjects of symptomatic gangrene, it will be almost always found that they have been addicted to spirit-drinking or gross feeding, or that they have been affected with some chronic disease of the heart, of the aortic valves, and of the great vessels—all of which are causes that operate most frequently in provoking irritation and inflammation of the arterial system. In most cases the gangrene is preceded by pains, sometimes of a very acute character, by fever, and other symptoms which announce the presence of inflammation; and pathological anatomy, as I have already observed, always demonstrates, in such a case, the existence of inflammation in the arterial coats. Such morbid actions may, doubtless, occur in arteries already diseased, indurated, or ossified, as we observe frequently in old people; but they are also met with in young subjects, in whom no trace of such morbid changes exists. In a word, this inflammatory action may coexist with the calcareous deposit seen in the vessels of the old, or it may occur quite independently of such condition; and ossification of an artery may itself result as the consequence of a former attack of arteritis.

Lastly, direct experiment on living animals proves, that inflammation of an artery which is excited by irritation, and which is followed by coagulation of the blood and the exudation of plastic lymph which glues it to the arterial walls, produces similar effects, determining artificially the same form of symptomatic gangrene as may, under other circumstances, occur spontaneously. M. Cruveilhier has indeed established the fact that the injection of irritating substances into the arteries of an animal occasions inflammation of the internal coat of these vessels, and consequent mortification of the parts to which they are distributed.

Case I.—*Gangrene of the left leg; hypertrophy of the heart, with ossification of the arteries, &c.*—Catherine Dupuix, aged 71, a servant, was admitted into the Hôtel-Dieu, in March, 1824. She ceased to menstruate at forty, and continued in excellent health until seven or eight years since, when she began to suffer from cold hands and legs, livid spots occasionally appearing on the palmar surface of the fingers; but these disappeared after some leeches were applied.

Between two and three months since, a black spot appeared, without apparent cause, on the third toe of the left foot, accompanied by pain which deprived the patient of sleep; and in the course of two months the entire anterior half of the foot became the seat of dry gangrene. On both the upper and lower surfaces of the foot there was a violet-coloured circle of inflammation, to which the patient referred her suffering: the pulse intermitted irregularly. The patient was blooded with marked relief: the foot was poulticed. At the expiration of a week Dupuix complained only of the sensation of cold. Two days subsequently she was again bled, with the same beneficial result of subduing the inflammation on the back of the foot; and the redness almost entirely disappeared from that part. At the early part of the following month, however (about a fortnight after her admission), the patient became delirious; the disease again began to spread, and she gradually sank, and expired on May 5th.

Autopsy.—The toes of the mortified foot were denuded, dry, black, and considerably diminished in volume: the tendons and a part of the ligaments were destroyed, and the bones themselves had become diminished in size. The third metatarsal bone was partly carious. The arteries of this part of the limb presented traces of common osseous degeneration, in an early stage: here and there clots were noticed which plugged the vessel. The veins, as far as the middle of the thigh, and especially the deep ones, were filled with dark clots. At some spots these clots had the yellowish appearance of fibrin. On cutting transversely through the left ventricle of the heart, its opposed sides were found to be in contact, so as to obliterate the cavity; and the aortic opening was narrowed, but presented no ossific deposit. At some points of the aorta, the first traces of atheromatous degeneration were observable; at others there were bony patches of limited extent: there was one of larger size immediately above its bifurcation. The right carotid, femoral and brachial arteries presented, here and there, flaky deposits of bone; in the affected limb these were more numerous; indeed, both tibial arteries were almost entirely converted into bone.

This case exemplifies the correctness of the principles I have laid down, viz., that in symptomatic gangrene there is very often disease of the heart and great vessels; and it proves, moreover, that the abstraction of blood has a marked influence on the progress of the disease, which was thus twice suspended, and its fatal issue for a time averted. It can scarcely be doubted that the purple patches on the hands were associated with the constitutional affection; they disappeared after leeching. Symptomatic gangrene may show itself in less common situations, as exemplified in the following case.

Case II.—*Gangrene of the scrotum and nates: death and autopsy.*—Louis Poinier, aged 60, was admitted into the Hôtel-Dieu, April 3d, 1824. From the little information which could be obtained respecting him, it appeared that he had been ailing for some days, and had suffered from purging and vomiting. On examination, the scrotum and nates presented great tumefaction, and the skin of this region was dark and exhibited patches of commencing gangrene; his pulse was feeble, the surface bathed in a clammy perspiration, and the patient was delirious. He did not long survive his admission.

Autopsy.—There was thickening of the arachnoid, and the pia mater was infiltrated with albuminous fluid. There was pus in the areolar tissue of the scrotum, but no trace of urine. The right cavities of the heart were hypertrophied and dilated; and the aorta presented several incrustations at different parts. In the iliac vessels there were several clots. The vasa deferentia were a little thickened, but not otherwise altered in texture and appearance, as high up as the internal ring. At this point, however, they almost suddenly assumed an osseous character, which they retained until they gained the side of the prostate, and then resumed their natural texture. The deposit of bone appeared to be in the fibro-cellular tissue; and the vessels had acquired a thickness of two lines at least.

Ossification of the vasa deferentia is a circumstance of rare occurrence: the foregoing is the only example I have ever witnessed of it. In the following case another part was the seat of the gangrene.

Case III.—*Symptomatic gangrene attacking the nose and fingers: death and autopsy.*—Auguste Gumery, aged 69, was admitted into the Hôtel-Dieu, March 21st, 1825. When I saw him he could not give any account of himself. His nose was of a deep violet hue, and so was the skin of the cheeks; and the little finger of the right hand was similarly affected. In these parts heat and sensibility were extinct. There was extreme general prostration, and the patient sank rapidly.

Autopsy.—In addition to the parts above mentioned, the fore-arm and nates presented patches of slough. The heart was large: its right side filled with clots, and its left ventricle manifestly thickened. The mitral valve and tendinous chords were ossified, as were likewise, in fact, the coronary arteries. The aorta possessed numerous bony patches in its tharacic division; the brachio-cephalic, right subclavian and common carotid arteries participated in the same condition; many points had a red tinge. The unusual seat of the gangrene constitutes the peculiarity in the above case: the following presents other points of interest.

Case IV.—*Arteritis; coagulation of blood; gangrene and death.*—Rigolet, aged 40, was admitted into the Hôtel-Dieu, with commencing gangrene of the right leg, July 15, 1832. She was a woman of spare but active frame, who had always enjoyed good health. She said she had recently suffered from cholera; but on being questioned, the only symptom was violent cramp in the right leg. A dull pain was felt in the iliac fossa of the same side, and extended, first along the inner part of the thigh, and then along its posterior aspect to the calf of the leg, thus gaining the sole of the foot and toes. The next symptoms in these parts were a stinging sensation and lancinating pains, succeeded by a burning feeling. After this, and about ten days before her admission into the hospital, the foot became cold, and purple spots made their appearance; the pain also became so severe as to prevent her sleeping. When I first saw this patient, the right leg, as high as the knee, was swollen to double its natural size. The skin was tense and shining, and of a purple hue, which increased in intensity towards the toes; and the discoloration was so disposed as to impart a mottled appearance to the surface of the limb. There were some points of vesication, and the loss of sensibility was proportioned to that of temperature; but, for obvious reasons, the movements of the leg were not yet materially interfered with. The circulation still continued unobstructed through the upper third of the leg. The pulsasion of the femoral artery of the affected limb could scarcely be detected, so indistinct and feeble was it; the vessel appeared as if converted, throughout its entire course, into a hard and almost incompressible cord. I believed this to be a case of arteritis; and accordingly ordered that the patient should be bled, and the limb enveloped in a poultice.

The bleeding quieted the pain, and the patient slept. It was repeated on the following day. On the succeeding day its effect was more remarkable, the pain had almost entirely ceased; the swelling was diminished; the heat and sensibility were restored at many points; but the vesications on the foot burst, and left exposed the gangrenous skin. The patient was bled a third time on the 22d. A few days afterwards, a line of demarcation seemed to be forming about four fingers' breadth below the knee: the patient could no longer move her foot, but complained (probably feeling as those who have suffered amputation) that she occasionally felt severe pain in it. This apparent arrest of the disease proved deceptive. Mortification again extended upwards, ultimately involving the whole thigh, and the patient expired, thirty-five days after her admission into the hospital.

Autopsy.—The body was much emaciated. The gangrenous limb was still much swollen, and the true skin dark, hard, and dry. Three large eschars presented themselves on the right side and back of the pelvis, extending from the iliac crest across towards the left side. In the middle of the thigh the femoral artery was contracted, but in other respects had a normal appearance: it was filled with a filiform, reddish clot, which seemed as if it had been formed after death. Near the crural arch the artery resumed its natural calibre, but was hard, incompressible, and occupied by a clot, which was red on the surface, and slightly adherent to the lining membrane of the vessel; in its centre it was grey, and seemed to be formed of discoloured and broken-up fibres. This condition existed as high as the common iliac trunk, and even extended a little into the left iliac, but without obliterating it. The right internal iliac vessel was also obstructed by the presence of a similar clot. The fermoral vein of the same side was occupied by a reddish clot. The vessels on the left side, the aorta, and the heart were nearly empty. Between the gangrenous and sound parts the capillaries were highly injected. The skin of the leg was dark and hard, like parchment; the subcutaneous cellular tissue was of a greyish-yellow colour; the muscles and nerves were bright red; the vessels near the ham were filled with clot similar to that in the thigh, but lower down they contained a reddish serum. The deep areolar tissue was infiltrated with this serum, and at some parts sloughy; the bones were pale. The viscera were healthy, with the exception of an increased redness of the small intestine.

In this form of gangrene, resulting from arrest of the supply of blood, the dead parts shrivel and dry, from the absence of the nutritive fluid on which their vitality depends. It is, therefore, easy to understand why the odour given out in these cases is quite different from that dependent on acute inflammation of the affécted structures.

The indications of symptomatic gangrene are very remarkable. In fact, from the first, it is entirely a local disease, and very puzzling to those unacquainted with its true pathology.

All the important organs perform their functions healthily; and it is only as the disease advances, and doubtless, in a measure, as absorption takes place, that the constitution seriously sympathises, and death ensues.

Gangrene is ushered in by a feeling of discomfort and numbness, attended by a sensation of coldness and pallor of the part, which are very remarkable. It is not, as one might suppose, a corpse-like coldness, such as would result from the affected part being reduced to the temperature of the surrounding air; but the loss of heat exceeds this, and the thermometer marks a lower degree of temperature than that which is imparted even by flowing water. Many experiments have satisfied me of the fact, that the temperature of a part on the eve of mortifying, is below that of the dead body or the surrounding atmosphere. With the loss of heat there is also loss of sensibility; but pain, and that of the most acute and agonizing character, accompanied by distressing itching, often attends this complaint. These phenomena are speedily succeeded by slight swelling, a mottled and violet hue of the parts; sometimes these latter signs are absent. Often vesication occurs; and beneath the raised cuticle an eschar is seen; at other times, there are no vesications, but in their place dark spots appear, which become eschars; sensibility is lost, and the affected parts die and become dry.

But the most interesting symptoms to watch are those which take place in the artery. The pulse is imperceptible to the finger, or even entirely ceases. In the course of the artery is felt a hard, round cord; and an accurate estimate may be made of the extent and progress of the disease by the limit of pulsation, and natural feel of the artery. This circumstance was noticed in the case above related: two days before the patient's death, I predicted that the internal iliac artery would be found plugged as high as the aorta. But it is right to bear in mind that the hard round cord which is felt, in these cases, in the course of the femoral artery, may be the obstructed vein. The sloughs on the pelvis, in this case, further presented this peculiarity, that they were limited to one side; a fact, which the obliteration of the corresponding arteries accounted for.

Case V.—*Symptomatic gangrene, followed by phlegmon and death.*—Brochard, aged 63, in good health, experienced pains, two years back, in his legs. The right hand, and especially the little finger became, ultimately, the seat of his suffering. This finger became insensible, and vesications, filled with fetid serosity, made their appearance. He suffered so much that, in a fit of rage, he amputated the ungual phalanx of the offending member. The disease, however, was far from being arrested by this mutilation, and the patient was admitted into the Hôtel-Dieu, in September, 1828. He was labouring under great constitutional disturbance, as evinced by a quick, sharp pulse, and a coated tongue, black at its base. The whole of the limb below the elbow was swollen, and the seat of acute pain. The brachial artery could be traced in one part of its course, where several points of ossific deposit were discovered. Gangrene did not extend, but he became delirious, and died about a fortnight after his admission.

On examination of the body, the inflamed parts were found bathed in pus; the muscles were separated from each other; and the last three fingers were in a state of gangrene. The axillary and brachial arteries, and those of the fore-arm were inflamed at many points, and presented numerous ossific patches. The veins were healthy. The aortic opening in the heart was contracted, and there were numerous thick osseous deposits scattered over this great trunk, as well as in the arteries of the lower extremity. There was an hydatid cyst in the liver.

Women are less subject to gangrene than men. It was formerly taught that this disease was more common in winter than in summer, on account of analogy to that form of the affection which results from frost-bite. But both the theory and consequences are equally false: it is in summer that symptomatic gangrene is most frequently met with; and it is this circumstance which first led me to conclude, *à priori*, that some other cause was to be sought for than simple obstruction of the circulation.

The treatment has varied according to the supposed origin of the disease. Pott, who made some valuable observations on senile gangrene, first employed bark and opium. But, finding the former of these drugs mischievous, he limited himself to the use of the latter, and with considerable success. Yet, even in the hands of this able surgeon, many fatal cases occurred, and a more available method of treatment was therefore still a desideratum. I have, myself, given every form of stimulant, but only with the effect of feeding the disease, when it had its origin in arteritis or ossification; and my views on this subject did not begin to take a right direction until the following case occurred in my practice.

Case VI.—*Symptomatic gangrene. Usual treatment without effect. Bloodletting, and recovery.*—A woman, aged sixty and odd years, came to the Hôtel-Dieu, to be treated for senile gangrene, affecting the toes of the left foot. She had suffered excruciating pain for some months prior to the appearance of the gangrene, and had been prevented from sleeping. The toes themselves presented the usual appearance of dry gangrene, and the neighbouring parts of the foot were swollen and livid, and the odour emitted was very offensive. For many months I had recourse to the usual forms of treatment, including bark and opium, administered internally and applied locally; but still the disease extended, involving soft and hard parts alike in its destruction. A careful examination proved the non-existence of any important organic lesion. Vexed and disappointed, I determined on trying a different plan of treatment, and in this I was guided by the pulse, which was full and hard, and the florid face. I bled her: the pain was mitigated; sleep returned; and the progress of the gangrene was suspended; in short, the patient had not felt so well since the commencement of her attack. At the expiration of a fortnight, the symptoms returned, and she was bled again, with similar benefit as on the former occasion. This treatment was adopted at each recurrence of the symptoms: the mortified parts separated, and the stump healed. Ultimately the patient left the hospital quite well.

Since the occurrence of the above case, many patients affected with senile gangrene have been treated by bloodletting, and always with similar success. But, is this treatment applicable to all forms of this disease? I think that it may be advantageously adopted, whenever the disease is accompanied with acute pain and much swelling, the pulse is hard and full, and the face flushed.

The foregoing case was published in 1824, by Mr. Marjolin, in the first edition of the 'Dictionnaire de Médecine.'

In all the cases of symptomatic gangrene which have come under my care, I have employed repeated bleeding, and have thus succeeded in curing, or at least relieving, two thirds or three fourths of the patients. The following recent case will serve further to exemplify the advantage of this plan of treatment.

CASE VII. — *Senile gangrene, cured by bloodletting.* — Pierre-Esprit M—, aged 71, a labourer, was admitted in the Hôtel-Dieu, early in March, 1833. Some days since he experienced an icy-cold sensation in the left great toe, which was speedily followed by an increasingly acute pain, the part itself becoming swollen, and assuming a livid hue. After the lapse of some days, a vesicle, enclosing a dark brown fluid, appeared on the inner side of the great toe towards its centre; and from this point a slough extended gradually, until the entire toe, as far back as the metatarso-phalangeal articulation, was involved in it. This slough was hard and dry; and the patient's suffering was such as to deprive him of both sleep and appetite. There was constitutional disturbance, but no disease of the heart or great vessels; the crural artery, however, on the affected side, was hard, resisting, and evidently ossified. The patient asserted that he had always enjoyed perfectly good health; that he had not been the subject of any accident to the toe, and could not account in any way for the complaint he was labouring under.

Being persuaded that this was a case of senile gangrene consequent on arteritis, followed by plugging and obliteration of the principal arterial trunks in the lower extremity, I did not hesitate to bleed the patient largely from the arm, and ordered the application of a poultice to the diseased part. The relief was marked and immediate: the patient slept soundly, his spirits rose, and his appetite returned. There was no relapse after this amendment: the gangrene was arrested; a line of demarcation was formed; and after the slough was thrown off, the part cicatrized, so that the patient was able to leave the hospital well at the end of April.

Opium is a valuable remedy; and, when combined with antiphlogistic measures employed according to the condition and power of the patient, I am acquainted with no better mode of arresting the progress of symptomatic gangrene at any period of its course. The surgeon will, of course, avail himself of other suitable means, both local and general, by which to second the influence of these important and primary agents, opium and bloodletting.

A very interesting question here presents itself: if the gangrene continue to extend, is it not sound practice to amputate all the affected or menaced parts, in order to preserve the rest? This operation has been performed by a well-informed surgeon frequently, and with success, during extension of the gangrene; why not follow his example? This is the answer to the question. Where the gangrene is consequent on some cause acting from without, both cause and effect may at once be removed; but in cases like the above, where gangrene is but a symptom, it is clear that amputation can have no direct influence in arresting the disease. In short, it may be laid down as a rule, that amputation ought to be deferred until the line of demarcation is defined, and the exciting cause of the disease has been subdued. There are, however, exceptions to this rule, as proved by a case under my care, in which gangrene attacked both feet, and destroyed the patient. This man had had his left great toe amputated two years before, for a similar affection, and had recovered. When his body was examined, very many of the arteries were found ossified, even including the cardiac branches. The principal arteries of the lower extremity were obliterated; and the vena cava itself presented some patches of ossification.

SECTION III.

ON LIGATURE OF THE PRINCIPAL ARTERIAL TRUNKS.

Ligature of the principal arterial trunks is one of the most brilliant triumphs of modern surgery. Not long since, the unfortunate subjects of aneurism in these arteries were doomed to almost certain death; for, spontaneous cure, or that by compression, are of rare occurrence. It is true that occasional instances have been met with, in which aneurisms have been cut short by inflammation, abscess, gangrene of the sac, or even by compression of the artery by the sac; yet these cases were but ill noted, and were consequently lost to science.

One of the main difficulties which for a long time impeded the advance of this branch of surgery, was the incorrect views which prevailed regarding the re-establishment of the circulation; an impression existing that the collateral branches were insufficient for this purpose. These misgivings were in part dissipated when Anel made known his method of treatment, and the mechanism of anastomosis was better studied. Then success was seen to attend the employment of the ligature on the brachial and femoral arteries, for aneurism at the bend of the elbow and in the ham. Still, for some years, no attempt was made to tie the iliac or subclavian trunks—the risk was thought too great. But, after a time, these vessels also were tied between the seat of disease and the heart. This method of operating was inapplicable to cases where the aneurismal dilatation is situated at the origin of the carotid or subclavian trunks, or in the common iliac or brachio-cephalic arteries. I propose, therefore, to arrange the observations I have to make in the present chapter, under two heads: the first comprising those cases in which a ligature may be applied upon an artery between the heart and seat of disease; the second, those cases in which it is necessary to apply the ligature between the aneurism and the capillaries. In order to render the subject more complete, I will also say a few words on Valsalva's method, and on compression.

Of the different forms of treatment proposed for the cure of aneurism, that of Valsalva, which consists in local and general depletion, has obtained a high repute. It was formerly more resorted to than at present, and I have remaked that it diminishes the resistance of the walls of the aneurism more than it enfeebles the heart's action; and I have further noticed that when the surgeon, tired of employing this mode of treatment ineffectually, begins to supply the patient with nourishment, with a view of operating, the tumour, surrounded by parts which have lost their elasticity, increases rapidly under the influence of the *vis à tergo*, threatening a fatal issue if situated in the subclavian or iliac regions. Pounded ice, iced water, or snow, may, under certain circumstances, be successfully applied to aneurismal tumonrs; but I cannot say the same of astringents and actual cautery, which are now generally abandoned.

Althongh Valsalva's method is far from possessing the recommendations ascribed to it by its inventor and his partisans, there are circumstances in which it has been of real benefit, as exemplified in the following instance.

Case I.—*Aneurism of the axillary artery, cured by Valsalva's method.*—Nicholas Robert, aged 61, a tiler, of sanguine temperament, was admitted into the Hôtel-Dieu in 1806, with a large tumour occupying the right axillary and subclavian regions. The corresponding limb was œdematous, and the pulse was scarcely perceptible. The first symptom which attracted his attention was a dull pain, accompanied with slight numbness, which subsided under the use of lotions. But two months before his admission, these symptoms reappeared, and the patient soon discovered a tumour, which, as it enlarged, aggravated the œdema and numbness of the arm. When admitted, the swelling presented an ovoid form, extending from above the level of the clavicle, to a point in the axilla below the nipple. The skin which covered the tumour was painful, shining and hard, and conveyed to the finger the sensation of deep fluctuation; at first, and on a superficial examination, but very slight pulsation was perceptible, but on a closer examination, it became more distinct, especially at the commencement of the axillary artery, just as it escapes from under the clavicle. Fearful of operating under these circumstances, M. Pelletan had recourse to Valsalva's method. The patient was bled and put on a low diet; vinegar compresses were applied to the tumour.

On the following day the swelling was softer, and the skin less tender. He was again bled, and on the succeeding day there was a sensible diminution in the bulk of the tumour, which could now be felt to consist of two lobes. This treatment was persisted in, and on the twelfth day, the tumour was diminished in size one third, and the pulsations had become very obscure. He had become, however, extremely feeble from want of nourishment; he had no sleep, and the general constitutional disturbance was alarming, yet the appetite did not fail. A more liberal diet soon restored him, and the case continued to proceed favorably.

Within a mouth of the patient's admission the parietes of the sac were more firm, and fluctuation was still apparent. A bag of ice was applied to the swelling, and renewed twice a day. This was continued for three weeks, and then the place of the ice was supplied by salt and water. Within two months from his entrance into the hospital this patient was dismissed in a very satisfactory condition. The tumour was considerably diminished in size, especially at its upper part, so that the pectoral muscles could be readily distinguished; but in the axilla it was still as large as two fists. As the absorption of the fluid part of the blood proceeded, there seemed but little reason to doubt that a fibrinous clot alone would be left for the absorbents ultimately to remove. I inferred that the artery was obliterated above the axilla, and that the blood found its way into the limb by the collateral circulation alone.

Ten months after his dismissal, Robert came to the Hôtel-Dieu, and I had the opportunity of carefully examining him. A very small and hard tumour was all that was then perceptible in the axilla, and this appeared rather as if attached to the neighbouring part of the chest than to the artery. The pulsations of this vessel were feeble above the clavicle, but more distinct below it. The brachial and radial arteries pulsated but feebly. When the axillary artery was compressed behind the clavicle, all pulsation ceased in the limb, which was well nourished and strong. There was a considerable depression in the breast itself near to the tumour. The patient had begun his work immediatetly after leaving the hospital, and had continued it without intermission or inconvenience since.

Latterly, recourse has frequently been had to compression in cases of aneurism, the compress being applied on the artery above the tumour. Of the various instruments used for this purpose, my compressor is that which is most commonly and successfully employed. It is made of different sizes, so as to be adapted to the arm or thigh, and suitable for children or adults. Isolated and free around the limb, it touches it only at two opposite points; and thus is well calculated to fulfil the desideratum of interrupting or arresting the flow of blood through the main trunk, whilst the collateral circulation is unimpeded. Though this instrument thus satisfactorily fulfils its purpose, some patients are unable to bear it; and, indeed, in the majority of cases, recourse must be had to the ligature, which, after all, is the most efficient method of treating aneurism hitherto proposed.

Case II.—*Aneurism of the popliteal artery, cured in three weeks by compression.*—In September, 1818, André Ivanowitz, a Pole, aged about 30, of sanguineous temperament and vigorous constitution, was sent to me to be treated for popliteal aneurism. He gave the following history of himself. He was serving in the army in 1815, and deserted when his regiment was about to pass under the Russian rule; he swam across the Loire, and proceeded towards Paris. He had scarcely begun his journey when he experienced a feeling of lassitude, and afterwards of heaviness and numbness throughout the back of the right leg, including the ham. This was followed by sharp pain, and he was obliged to complete his journey more leisurely than he had commenced it. Bathing and rest mitigated these symptoms, and in a fortnight he had quite lost them. Eight or ten months afterwards, during which time he was actively occupied, he fell down stairs, in such a way that his leg was forcibly bent on his thigh, and had the whole weight of his body thrown upon it. He experienced at the time a tearing sensation and pain in the ham, and was quite unable to support himself on this leg. He dated the origin of his disease from this injury; but he was probably mistaken, as the foundation of it was most likely laid at the period of such great exertion immediately after he quitted his regiment. Indeed, this seems to be the natural explanation of the suffering he endured during his journey; and the fact that the diseased artery was only progressively dilating accounts for the patient being able, without inconvenience, to follow a laborious occupation. I therefore infer that some part of the coats of the diseased artery gave way when the accident occurred; for it is at least improbable that a healthy artery would yield under compression, though laceration may result from extension. However this may be, in the course of eight or ten days afterwards he perceived a tumour as large as an egg in the ham. He did not feel any pulsation; but it will be seen, in the course of the case, that this sign might have been present without being noticed. The pain, however, ceased, and a constant sense of numbness and lassitude about the back of the leg alone remained. He continued his occupation, but was forced from time to time to keep entirely at rest, in consequence of the weakness of the limb, and the occurrence of acute pain when he worked hard. As the swelling increased, the symptoms became more and more aggravated in proportion, and at length he was wholly incapacitated from using his limb. Two years had now elapsed since his fall, and he consulted a medical man, who mistook the nature of the disease, and directed that a liniment should be rubbed in. Shortly afterwards, its true nature was detected, and the patient was sent to me.

When I first saw him, the tumour had acquired the size of a turkey's egg, not only protruding backwards, but also thrusting to either side the boundaries of the ham; the pulsations in it were distinct, and synchronous with the pulse; but these had been overlooked by the patient, till his attention was directed to them. The knee-joint was immovable, partly owing to the presence of the tumour, partly to the œdematous condition of the limb; the numbness was constant, and he suffered pain whenever he attempted to walk. The urgency of the case induced me to recommend an immediate operation; but the patient, without refusing to submit, begged me first of all to try some gentler method of treatment.

I had succeeded, a short time before, in curing, in a few days, a similar case of extensive aneurism by compression of the femoral artery; but I was disposed to regard this result as one of those lucky chances, which occur occasionally in the course of a long practice, and which cannot be referred to as a precedent. Indeed, before this, only two well-authenticated cases of cure of aneurism by compression had been recorded; and in both instances the patients had been compelled to wear the apparatus that had been used for a very long time. This consideration had deterred me from resorting to this mode of treatment in other cases; but the present occasion afforded me another opportunity of demonstrating, as the result proved, that the duration of the treatment was due to the imperfection of the instruments, rather than to the principle which they were designed to carry into effect. I accordingly applied to the middle of the femoral artery the compressor I usually employ to arrest the flow of blood in amputation. The principle upon which this instrument acts is similar to that of the ordinary tourniquet, but modified so that, whilst it perfectly commands the femoral artery, it makes pressure upon only two points, which are exactly opposite to each other; and when once applied, its hold is so firm that no jar can loosen it, nor do even walking or other movements disturb its accurate adaptation to the limb. The patient was instructed to relax the compression whenever it produced severe pain, either in the limb or at the seat of its application. The tumour itself was covered with pounded ice.

He attended strictly to the directions given to him; whenever he felt much pain, a few turns of the screw relieved him; and after a few seconds he again tightened it as before. The first effect of the compression was greatly to increase the numbness; but about the fifth or sixth day this symptom disappeared altogether, and almost suddenly. The patient had also by this time partly regained the power of moving the leg on the thigh; and the tumour, as well as the œdema of the limb, had diminished; moreover, when the compression was removed, the pulsation was found to be weaker. The amelioration of all the symptoms continued, and the patient was enabled, as he got more accustomed to the pressure, to wear the instrument more continuously, removing it only at longer intervals; he himself remarked that, at each removal, the pulsation in the swelling sensibly diminished. On the twentieth day the limb had resumed its natural size, shape, and sensibility; and he was able to move it freely; he then took off the instrument himself and returned to his work. When I saw him a few days subsequently all pulsation had ceased; and after the lapse of a month the only trace left of the tumour was a hard immovable mass, as large, at most, as a pigeon's egg; and he was able to use the limb as if nothing had ever been the matter with it.

To what is the cure in these two cases due? Was it accomplished by obliteration of the femoral trunk, as a consequence of adhesive inflammation produced by compression? Certainly not; for in both instances the pulsation of the artery could be traced to the opening in the adductor magnus. It can only be referred to coagulation of the blood in the aneurismal sac, induced by rest and the absence of impulse from behind; the application of ice to the swelling would, of course, assist in procuring this result.

The proceeding now generally adopted is that of Anel or Hunter. When an artery is thus tied, it is essential that it should be exposed at such a distance from the sac, as to insure its being perfectly healthy, and in a position where it is most easily accessible, and most readily admits of the successive steps of the operation being performed. Another point of no less importance is to preserve about the seat of operation a sufficient number of collateral branches to maintain the circulation below the seat of ligature; further, the artery should be tied not too near the large collateral branches, especially the upper ones; for their proximity is one of the most rife causes of secondary hemorrhage. The external incision should be free; and the division of the fasciæ should be more extended than that of the skin.

The diagnosis of aneurism is easy when the disease is recent; but it becomes very embarrassing when it is of long standing, large, and irregular. If an artery is in any way covered by a cyst, a cold abscess, or by deep glandular enlargement, or a collection of blood or of gelatiniform matter, it is necessary to be especially careful, as there are no regions where large arteries exist, in which, under these circumstances, aneurisms have not been mistaken for abscess. Lastly, the aneurismal sac may give way to a small extent, and the blood become extravasated little by little, until a tumour is formed in the cellular tissue at a distance, presenting neither pulsation, nor any other of the physical signs which distinguish ordinary aneurism. I have witnessed one very singular case of this kind, in which the blood escaped from an opening in the aorta, and burrowed along the areolar tissue of the neck, forming several tumours, the opening of which was followed by trifling hemorrhage, but so incessantly renewed, that the patient ultimately sank under it.

Case III.—*Aneurism of the subclavian artery, mistaken for an abscess.*—Marie Charlotte Margue, aged 69, came from the country into the Hôtel-Dieu, in April, 1810, suffering from two gangrenous sloughs in the inside of the elbow; and these were accompanied by œdema and loss of power of the limb. A fortnight after admission, the patient was going on well, when she complained of a little swelling, about the size of an almond, in the axilla of the affected side. The dresser took this for a swollen gland; and though he could not detect the pulse at the wrist, he attributed this to the œdema, or to ossification or contraction of the artery. Six days later, as she suffered more, I examined her myself. On feeling the tumour, fluctuation was distinct, but no pulsation could be detected. I believed it to be an abscess; and I founded this opinion on the history of the case; the existence of ulcers at the elbow, the marked decrease of suppuration, the rapid development of the tumour, and finally the complete absence of pulsation. (To have removed all doubt, the artery should have been compressed above the tumour.)

The opening of the supposed abscess was deferred until the following day, when the patient was further questioned respecting the history of her complaint, &c. and her answers appearing satisfactory, I took a long, narrow and sharp-pointed bistoury, and passed it slowly and cautiously into the most prominent part of the tumour, where fluctuation was most apparent. On withdrawing the instrument, it was followed by a jet of arterial blood. I at once closed the opening with my finger, and felt the pulse of the diseased limb. The artery seemed full but without pulsation. I was, for a moment, disposed to ascribe this jet of blood to the section of a superficial branch greatly enlarged by inflammation. The removal of my finger from the orifice, however, speedily satisfied me that I had indeed opened an aneurism; and now, for the first time, I detected a slight quivering sensation in the tumour, like that of a body in vibration.

Margue was again questioned; and from her answers, which were now true, we learned that four months previously she had had a fall by which her shoulder was injured. Neither fracture nor dislocation could be detected by a surgeon to whom she applied; but being dissatisfied, she consulted a bone-setter, who said her shoulder was out, and used immoderate violence in pretending to set it to rights. The condition of the arm for which she was admitted was the consequence of this violence; but she dated the origin of the axillary swelling to a fall on the elbow which she had some days subsequent to her admission into the hospital. The wound was closed with plaister, compress, and bandage.

But some more decisive measures were called for in order that the patient's life might be saved, and I proposed tying the sub-clavian artery where it passes between the scaleni muscles. To assure myself and others of the feasibility of this operation, I performed it on the dead subject repeatedly and without difficulty. Some such decisive step was now rendered essential; for the tumour, which pulsated, pressed upwards the clavicle, and an indistinct whirring sound, such as attends the passage of blood from an artery into an aneurismal sac, was audible. The division of the swelling into two parts was now also ascertained, the smaller of which pulsated, and extended below and along the clavicle; the larger fluctuated. There seemed to be no reasonable objection to the operation; for, though the clavicle was raised by the tumour, this disadvantage to the operator was amply compensated for by the guidance which the pulsating artery afforded. Gangrene of the limb from privation of blood was another result suggested; but, how many considerations founded on theory disappear at the bed-side of the sick! Moreover, English surgeons had succeeded in tying the external iliac artery, which is to be regarded as the more serious operation of the two; and the scapular branches of the subclavian trunk subserve the same purpose in the collateral circulation, as the obturator ıd ischiatic branches of the internal iliac in the lower. Finally, certain death awaited the patient if left to herself. These considerations induced me to propose the operation, but unfortunately M. Pelletan, whose position made his verdict decisive, did not take the same view of the case, and preferred the adoption of milder measures; and thus French surgeons were robbed of the honour of being the first to perform this beautiful operation.

The treatment by Valsalva's method was adopted, and the patient was at once bled. This prostrated her very much; and on the fourth day a slough separated, followed by hemorrhage. This was shortly succeeded by further loss of blood, from which the patient did not rally; and she expired on the morning of the 20th of May.

Before examining the body, the external characters of the tumour were the subject of observation. It was very large, and pressed forwards the great pectoral, and backwards the latissimus dorsi, muscles. The superjacent integument was of a dark livid hue, and exhaled a distinctly gangrenous odour. There were two openings in the skin, one of which was the seat of puncture, and the other the spot from which slough had separated; and from both a bloody fluid oozed. The integuments being carefully raised, the two pectoral muscles were detached from their origin and turned back. Some further dissection displayed the tumour in its full extent. It was equal, at least, in size to an infant's head. Above the tumour the artery retained its ordinary calibre for about two inches in extent, so that it might have been tied at this point, if a ligature can be placed upon this vessel below the clavicle. This bone was very much pushed upwards; the vein was but little disturbed, being situated external and anterior to the artery; and the relation of the latter vessel to the brachial plexus of nerves was unchanged.

At the border of the tumour there was a considerable dilatation of the arterial parietes, which was separated from the main swelling by a deep depression, in which were lodged the median nerve and axillary vein; the latter of these was in a disorganized state. A probe introduced into an opening made in the dilated portion of the artery, readily found its way into the cavity of the tumour; and, in like manner, when introduced into a healthy part of the artery, it passed into both the aneurismal dilatation and the interior of the tumour. On laying these open, the larger one was found to be bounded by the cellular tissue, and containing clots of blood; it was this which had been mistaken for an abscess. The interior of this tumour communicated with the true aneurism by an orifice at the back and outer part of the latter; the laceration having probably been the consequence of the violent blow on the elbow sustained by the patient. The neighbouring muscles were shrunk. Below the tumour the artery was much diminished in calibre; and immediately beneath the sac the obliteration was complete; a fact which accounts for the absence of the pulse on the affected side.

In reviewing the chief points of this case, we cannot but conclude that the aneurism was occasioned by the severe pulling to which the arm had been subjected by the bone-setter; an analogous case is reported by M. Flaubert, in the 'Répertoire d'Anatomie,' as having occurred at the Hôtel-Dieu of Rouen. The error in diognosis is deserving of notice, as proving the existence of difficulties, especially in cases of tumours, in that branch of the healing art which is regarded as most sure and free from such mistakes. The employment of a grooved needle is advisable wherever a doubt exists as to the nature of a tumour. The present case was clearly one of true aneurism, complicated with false or secondary aneurism by the rupture of the sac. The distension of the integuments, and the compression and cold employed to restrain the hemorrhage, sufficed to account for the gaugrene which ensued.

I was convinced by the foregoing case, that ligature of the subclavian would have been the proper treatment, and determined to perform this operation in any similar instance which might present itself. Many years, however, elapsed before the opportunity was afforded me, during which I tied successfully the common carotid and external iliac trunks. At length, in 1819, a man came to the Hôtel-Dieu, with axillary aneurism, the details of whose case I now proceed to narrate.

Case IV.—*Ligature of the subclavian artery for false axillary aneurism.*—C. le Chevalier, aged 37, by trade a joiner, but for many years a soldier, was admitted into the Hôtel-Dieu, in February, 1819, with false aneurism of the left axillary artery. Having been taken prisoner in Spain, in 1811, he tried to make his escape, but was pursued by a horseman in charge of the prisoners, and struck down by a blow with a sword on the back part of the left shoulder. He fainted from loss of blood; and the wound was then dressed. In three weeks the small wound was healed, without any further bleeding.

Two months afterwards the patient felt a small pulsating tumour, about the size of a nut, in the axilla. This continued to increase in size during the two years that he was kept a close prisoner, until it attained the size of a hen's egg, and the pulsation became more forcible. The fatigue attending a long march further aggravated the symptoms; and the large size of the tumour, together with the suffering it entailed, and his incapacity for work, at last induced him to come to the *Hôtel-Dieu*.

On admission, the cicatrix of his wound was apparent, being situated in the depression which separates the teres major from the teres minor, and subscapularis. The tumour occupied the axilla, and was as large as the head of a child a year old; rounded but uneven, especially at its lower part, and covered with distended veins; it was hard and resisting to the touch, and pulsated strongly. It raised the arm from the side, and distended the great pectoral muscle, pushing upwards the whole shoulder, and deepening the depression behind and above the clavicle. The arm was attenuated; the fingers were numbed; and the movements of the limb were limited; the brachial artery and its branches did not pulsate, but the heat and sensibility of the surface generally were unchanged. The subclavian artery pulsated strongly; and when compressed by carrying the finger down deeply behind the clavicle, the tumour also ceased to pulsate.

Under these circumstances something decided was required, and the question was what should be done. My objection to Valsalva's treatment was, that I had frequently observed this debilitating practice had the effect of weakening the action of the heart less than that of the aneurismal swelling, and thus tend to a fatally rapid enlargement of the latter. Compression beyond the tumour was obnoxious to the objection, that, by retaining the blood in the sac, and thus concentrating the force of the circulation upon its parietes, it would tend to produce rupture of the aneurism; pressure, again, made upon the sac itself, would probably produce immediate gangrene. Lastly, compression above the sac would scarcely be regarded as available in a case like the present.

The only alternative, therefore, was to tie the artery; and then came the further question, whether the ligature should be applied below the tumour. The result of such an attempt on the femoral had proved its disadvantages. Brasdor had proposed this plan to the old school of surgery; and Deschamps had practised it in a case of extensive aneurism in the upper part of the thigh. A ligature was passed, with great difficulty, below the sac, but its increase was so rapid, that on the fourth day rupture appeared imminent; and a new operation was then decided on; two ligatures were placed on the artery above the aneurism, and one below it; but the loss of blood during the operation was so considerable that the patient died eight hours afterwards.

Should the sac be opened, and a ligature be placed on the artery above and below it? In the first place death from hemorrhage would be a probable consequence of such a proceeding; or if the patient survived the operation, the exposure of the interior of so large an aneurism must be followed by inflammation and suppuration, which would speedily prove fatal, by involving the neighbouring parts.

I therefore determined on adopting the alternative of placing a ligature around the artery above the tumour. Still, another question remained to be solved: which part of the subclavian trunk (for the axillary was out of the question) should I select for this operation? The subclavian artery may be divided into three distinct parts on the left side; the first comprising that division between its orifice and the scaleni muscles; the second, whilst it is between the scaleni; and the third extends from these muscles to the front of the first rib. This third division is sufficiently superficial in thin people with low shoulders; but where the shoulders are high and the neck is short, and especially when a tumour exists (as in this case) to displace the clavicle upwards, the artery is deeply buried behind this bone. Further, in this position, the nerves are so closely associated with the artery, that it is difficult to separate them from it. This latter objection does not apply to the second division of the artery, which here lies isolated between the scaleni, and separated also from its accompanying vein. The depth at which the vessel lies, in the first part of its course, together with its proximity to the pleura and lungs, render the operation of placing a ligature around it here both difficult and dangerous.

For the above reasons, the middle division of the course of the subclavian artery was selected for operation; and as a preliminary caution the patient was bled. He was placed on a couch, in the recumbent position, and I commenced by making an incision, extending somewhat obliquely from above downwards and outwards, at the lower part of the left side of the neck and about an inch above the clavicle. After a little dissection the outer border of the scalenus was sought for, and when found it was completely divided near to its insertion with a button-pointed bistoury. The artery could then be felt distinctly pulsating at the bottom of the wound. A curved director was carried round the vessel, and a probe, armed with a silk ligature, was passed along the groove and brought out on the other side. Having ascertained by repeated trials that the artery alone was included I tightened the ligature, and all pulsation in the tumour immediately ceased. Scarcely any blood was lost during the operation; three small arteries had been tied at its earliest stage. The wound was lightly dressed; and the arm, supported by a pillow, was surrounded with bags of hot sand.

During the day the patient complained of slight pain in the throat, and was therefore bled; the tumour continued without pulsation. He passed a quiet night; and on the following day the arm retained its warmth, muscular power, and sensibility: there were slight darting pains in the tumour. On the sixth day the wound was suppurating healthily, and the tumour had diminished in size. The bowels not having been moved, a purgative was administered, which had the desired effect. On the eleventh day the ligature came away, without the least loss of blood. Seventeenth day; the wound closing, and purulent discharge diminished; tumour reduced by one third, and pulseless. Thirtieth day; wound almost healed; patient began to use his arm; sac still contracting in size, but soft and fluctuating, as if it threatened suppuration. Goulard lotion ordered. From this date the patient continued to improve steadily; the tumour became firm, and diminished to one fifth of its former bulk at the end of eleven weeks. The warmth, sensibility, and muscular power of the limb remained unimpaired. The circulation was characterized by a peculiarity common to all limbs in which the principal artery has been tied, viz., that the arteries are entirely without pulsation; to the touch they appear full, but the blood, in passing through the collateral circulation, ceases to be influenced by the heart's action, and the vessels are therefore pulseless.

In the course of a few months after quitting the hospital, Chevalier resumed his former occupation, and continued free from any complaint for three years. At the end of this time, he was attacked with inflammation in the axilla, after excessive exertion, and was again admitted into the Hôtel-Dieu. There was a swelling as big as a fist in his arm-pit, and the skin over it was thin and red, appearing at one point as if about to burst. There was no pulsation in this tumour; and as the patient had suffered from rigor and was constitutionally ill, there was little doubt that matter had formed. The patient objected to an opening being made, and therefore the pus was allowed to discharge itself spontaneously, which it did in the course of a fortnight, in great abundance. The character of the secretion, mixed with broken-down clots, indicated the source of the suppuration; but not a single drop of arterial blood escaped. The aperture was enlarged, and the patient made a good recovery, leaving the hospital in about a couple of months afterwards quite well.

There are many points of interest and deserving of attention in this case, both in reference to the disease itself, and the operation adopted for its relief.

In a recent case of axillary aneurism near to the brachial, the artery may be tied between the tumour and the clavicle. But in more advanced cases, where the tumour has attained a large size, and occupies the axillary close to its origin, it is requisite to tie the subclavian. M. Pelletan attempted to place a ligature on the axillary artery immediately beneath the clavicle, for a large aneurism filling the arm-pit, yet leaving a considerable interval between the tumour and the clavicle; but the operation was abandoned after several ineffectual attempts to carry the ligature round the artery, which were frustrated by its extreme depth. The patient died of inflammation of the chest, at the end of three weeks.[1] Even in attempting to tie the subclavian artery, the operator may be foiled by the enormous development of the tumour, and the displacement of the clavicle: this happened to Sir A. Cooper.[2]

The peculiarity of the operation in the foregoing case, is the position selected for the application of the ligature and the division of the anterior scalenus for the purpose of exposing the artery. By this proceeding, which is both simple and sure, the artery is most readily found, and all risk of injuring or tying either vein or nerves is obviated.[3]

Compression or lesion of nerves seems to be the most common cause of gangrene after operations for aneurism. Cases have been recorded by Dr. Orpen and by Van Swieten, where, after spontaneous cure of aneurism, the limb has continued useless, apparently from long sustained pressure on the nerves.

We learn also from the above case, that the collateral circulation is equal to the task thrown upon it, whether near to or distant from the trunk. Many cases are recorded, which illustrate the correctness of this remark. Lastly, we are taught what course nature takes to rid herself of an useless mass of blood still retained within the original aneurismal sac. Inflammation is established, and suppuration ensues; and thus, by a spontaneous opening of the sac, without risk of hemorrhage, the offending matter is cast off and the cure is completed.

CASE V.—*False consecutive aneurism of the right axillary artery, treated by ligature of the subclavian.* Jacques Marie Cologe, aged 38, a custom-house officer, was admitted into the Hôtel-Dieu, in March, 1819, with aneurism of the right axillary artery. Six years previously he had been the subject of a severe attack of syphilis, followed by gonorrhœa on two occasions. He suffered, in consequence, from disease of the nasal bones, deafness, pains in the bones, &c. He was cured of these affections, and his general health had been for some time very good, when he was wounded at the siege of Strasbourg. The injury was inflicted by a Cossack's lance, which penetrated the interval between the great pectoral and deltoid muscles on the right side of his chest, and about three inches below his clavicle. This occurred in 1815.

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[1] Pelletan; 'Clinique Chirurgicale,' tom. ii, p. 40.

[2] 'London Medical Review,' t. ii, p. 300.

[3] This appears to be the commentary of the French editor, who takes no notice of the serious risk to the phrenic nerve in this operation. The succeding remarks also seem to come from the same pen.—T.

He lost a large quantity of blood and fainted, when the hemorrhage ceased spontaneously. In a fortnight, the small wound had healed and the arm in part recovered its mobility; but after the lapse of a month, a pulsating tumour, about the size of a pigeon's egg, made its appearance in the axilla, unattended, however, with any discoloration of skin. The hand and arm swelled, but the patient continued to work; the tumour increased in size, the pulsations becoming more forcible, and the pain suffered more severe. For six months he was kept in bed, and had the whole limb, as high as the tumour, firmly bandaged. This treatment was attended by some reduction in the general swelling of the arm and the size of the tumour, as well as diminution in the force of its pulsation. The patient was then set at liberty, and for nearly two years was entirely free from any inconvenience, except that he could not use the affected arm. The hand was wasted, and the fingers were much flexed. He came to Paris three months before his admission; and a week prior to the date of his applying at the hospital, without any assignable cause, the tumour suddenly increased during the night, and its subsequent extension was attended with excruciating pain.

When admitted, the cicatrix of the original wound was still apparent. In the axilla, and extending as high as the clavicle, there was a large, colourless swelling, the skin covering which was very thin, and traversed at parts by distended veins. The strong pulsation in this tumour—synchronous with that of the heart—the tension and thinning of the skin, and the acute suffering of the patient combined to suggest the impression that it would speedily burst. As a consequence of the disease, or perhaps of the treatment which had been adopted, the hand was wasted, and the fingers were much bent; the corresponding clavicle was forced upwards, and the subclavian artery sunk into a deep hollow; and the arm, which was raised from the side by the tumour, was powerless. The pulse at the wrist was but just perceptible. The patient suffered acutely and without intermission; he perspired profusely and got no sleep. He was bled, and an evaporating lotion was applied to the swelling.

During the night all the symptoms became aggravated, and he was again bled, with some relief. On the following morning he was much prostrated; and as there could be no doubt about the nature of the disease or the proper treatment to be adopted, the operation of tying the subclavian artery, as in the previous case, was proposed, and gladly acceded to by the patient. It should be remarked that the subclavian artery could be felt pulsating, by carrying the finger down to it above and behind the clavicle; and that pressure in this position arrested the pulsation in the tumour.

Standing on the left of the patient, I made an oblique incision from the border of the sterno-mastoid downwards and outwards towards the clavicle, dividing the skin, subcutaneous cellular tissue, and several small arteries which required ligatures. A paroxysm of pain interrupted the operation, which was resumed after the lapse of a quarter of an hour. A grooved curved probe was passed, with some difficulty, beneath the artery; but on attempting to introduce a stylet, armed with a ligature, I was foiled, as it would not follow the curve of the probe. At this stage of the operation, in endeavouring to disengage the artery from its connections to the plexus of nerves and the surrounding areolar tissue, a sudden jet of scarlet blood arrested the attention, this was stopped by pressing with the finger at the bottom of the wound, and the bleeding did not recur when the pressure was removed. It was evident, however, that either some artery had furnished this blood, or that the sac had been opened.

One extremity of a grooved probe was then perforated, and this occupied a quarter of an hour; after which, this instrument was passed around the artery, and threaded with a needle armed with a ligature. After removing the probe the ligature was tied, the effect of pressure upon the artery having been tested previously by raising the probe, and found to be satisfactory. The agony occasioned by tightening the ligature induced an apprehension that some nervous trunk had been included, a second knot was therefore tied without further increasing the pressure, for I knew that it was not essential that the ligature should be tight to produce inflammation and obliteration of an artery, and that temporary ligatures had answered the same purpose. Pulsation ceased, but there was still an almost imperceptible vibration or tremor in the swelling. A reserve ligature was left at the lower part of the wound; and after the application of a simple dressing, the patient was carried to bed.

During the day he suffered a good deal in the back of the neck, but the pain had entirely left the tumour; and pulsation was no longer perceptible, either in the swelling or in the radial artery at the wrist. The limb was surrounded with heated sand-bags, and retained its natural temperature, as well as its sensibility and muscular power. There had been no loss of blood since the operation; and the patient had perspired profusely. In the evening the limb was slightly benumbed, and a tremor or vibration could be felt on placing the hand on the tumour.

After a quiet night, the patient continued comfortable. The tremor in the swelling was more distinct, but he was free from pain; and this favorable condition was uninterrupted for the first twenty-four hours. I may here remark, that the operation was protracted by unforeseen delays; and that much difficulty would have been obviated by division of the anterior scalenus muscle. Moreover, the large size of the tumour, by raising the shoulder, threw the artery into a deep depression behind the clavicle.

On the second day, there was a return of pain, and want of sleep; the vibration in the tumour was still more apparent. On the third day, this increased to distinct though slight pulsation. Ice was applied, but removed on the pain becoming aggravated; and afterwards the tumour seemed to become larger and more painful. A restless night succeeded; and on the fourth day the tumour had still further extended itself, and pulsation in it became more distinct. The skin had assumed a purple hue, and dark-coloured vesications had appeared here and there.

I was perplexed to acconnt for this return of pulsation; for, though I was prevented from drawing the ligature as tightly as I should otherwise have done, by the conviction on my mind that a nerve was included, it was, nevertheless, tight enough to arrest the flow of blood on the first day. The pain still increasing, some blood was taken from the arm. In the night hemorrhage from the wound took place, which was stopped by the introduction of a finger into the wound; a compress was afterwards applied.

On the fifth day, the patient presented a pale and emaciated appearance: his suffering was great, and the tumour continued to pulsate. He lost more blood in the course of the day, but the hemorrhage was arrested by tightening the bandage which confined the compress. It again recurred, however, on the sixth day, when an attempt was made to render the temporary ligature available; but this was rendered abortive by the extreme pain it occasioned. Further bleeding took place in the night. On the seventh day, the little finger became gangrenous. Ice was continued to the tumour, but without controlling the pulsation in it. During the succeeding night, the patient became suddenly insensible and convulsed; respiration was short and frequent, and the pulse rapid and irregular. This state continued through the eighth day; stimulants produced only a temporary revival, and he ultimately died comatose in the afternoon.

Autopsy.—The great and small pectoral muscles and the deltoid were raised, distended, and wasted. Some rather soft clots of dark blood had penetrated to the front of the tumour, pressing before them the great pectoral and deltoid muscles, which at this spot were converted into a blackish mass; and the superjacent skin, which was traversed by dilated purple veins, gave out a gangrenous odour. The thin layers which surrounded the tumour on its sides and back, broke under pressure rather than were crushed. The centre of the tumour was occupied by dark, semifluid blood, and this extended in a thin layer external to the clots first mentioned; as much as two pounds was removed in all. At the bottom of the cavity, a small aperture, four lines long and one wide, was perceived, and this communicated with the artery. The lining membrane of the vessel seemed to extend for about an inch and a half from the circumference of this opening, right and left; and was supported by a thick, red tissue, containing osseous concretions, similar to those so often met with between the inner and middle coats of an artery. There was no line of demarcation indicating the exact point of origin of these tissues, which surrounded a cavity capable of containing a hen's egg. Another larger cavity surrounded this, having for its parietes all the muscles mentioned above, and extending from the clavicle to the middle third of the upper-arm. The interior of this larger cavity was irregular, and its sides black; and there was a direct communication between the two by a ragged opening, the larger cavity having also been rent on the inner side of the artery, and thus permitted the escape of blood, which had diffused itself amidst the nerves of the brachial plexus.

Below this point, that is behind the tendon of the great pectoral muscle, a rounded, uneven tumour was seen to spring abruptly from the dilated artery. This was developed on all sides, but especially outwards, and to the extent of two inches along the vessel, so that its point of origin from the artery could not be seen until it was raised and drawn on one side. The exterior of this tumour was formed of elastic white tissue, similar to the outer coat of arteries: internal to this was a reddish tissue containing osseous concretions; and the lining membrane was that of the artery itself. The parietes of this sac became thinner, as they receded from the artery; and at the distance of a few lines were immersed in the black blood which has been mentioned as filling the great cavity.

The internal mammary artery, and some of those supplying the neck, seemed abnormally dilated at their origin. The posterior scalenus muscle was slightly involved in the wound. The inferior of the three brachial nervous cords was included in the ligatures; whilst the artery itself was perforated without being completely enclosed in the nooses. Pus and dark blood filled the wound.

The posterior part of the left hemisphere of the cerebrum presented a greenish hue beneath its membranes; more deeply the substance of the brain was soft, grey, and disorganized; and some greenish fluid escaped from the part. The structure of the brain generally was somewhat firmer, and permeated by injected vessels. The disorganization extended about two lines in depth, and communicated with the ventricle of the same side, although the arachnoid lining of this cavity was very little altered in character. The pia mater was a little injected.

Air was extravasated beneath both membranes. The other organs were healthy.

This case is valuable in illustrating the course, the symptoms, and the progress of aneurismal tumours. It also exhibits the importance of not trusting too entirely to the best laid plans for performing an operation, as new features so commonly present themselves in particular instances, taxing the ingenuity and resources of the operator, and demonstrating the absurdity of attempting to reduce surgery to the condition of a strictly mathematical science. The casualties attending such operations are also exemplified; and the post-mortem appearances furnish an interesting commentary on the formation and development of aneurismal tumours. I would throw out as a suggestion that, possibly, the accident of wounding the artery and tying the nerve might have been obviated by dividing the anterior scalenus muscle.

The case which I shall relate next is one of ligature of the common carotid artery, for a disease consisting in dilatation of the arteries, and the original development of an accidental tissue, similar to that of the corpora cavernosa penis (aneurism by anastomosis). The gravity of diseases affecting the carotid artery and its branches, had often made it a subject of regret that the same treatment could not be adopted in reference to them as to the arteries of the extremities.

Yet many considerations seemed to encourage the expectation that such operations would not be unattended by success; for, frequently the carotids had been tied, singly or at the same time, in the lower animals, without danger; but, with perhaps too scrupulous a rejection of the dogma—that what applies to animals generally may be equally applied to man—surgeons left these experiments in the hands of physiologists, and thus threw away the opportunity of generalizing on a subject which afforded such natural and reasonable grounds for a practical deduction. Nor were the numerous decided examples of spontaneous obliteration of the carotid trunk regarded as a sufficient justification of the operation; for, though such instances were unaccompanied by any functional disorder of the brain, it was well known that a process of gradual diversion of the circulation is much less hazardous to the parts supplied than its sudden arrest.

Other motives likewise influenced surgeons in shrinking from this operation. The impracticability of compressing the carotid in case of accident; the number and importance of the nerves, veins, and other parts around the vessels, and the difficulty of excluding all from the ligature; and finally, the risk attending a sudden interruption of the supply of blood to the brain, the importance of which could not but be regarded as of a far graver character than where a limb was the seat of operation.

Further observation and experience demonstrated the fallacy and groundlessness of many of these objections; as, for instance, the difficulty of disentangling the artery from the adjacent tissues, or the lack of blood, from the interrupted circulation, to the brain. Surgeons also learned that, however essential it is to be able to command the supplying artery, in the operation of laying open the aneurismal sac, it is needless in Anel's operation of tying the artery between the heart and sac.[1]

Still, in spite of these ascertained facts, patients were allowed to suffer and die, until Sir Astley Cooper's first case paved the way to a bolder and better practice. It is true he was unsuccessful the first time; but the failure was due to circumstances which were unconnected with the operation. His second attempt succeeded, as the operation has in almost every instance since.

The following case is interesting, both as an illustration of the safety of the operation, and of a singular disease.

CASE VI.—*Ligature of the carotid artery in a case of aneurismal dilatation of the arteries of the ear, temple, and occiput, &c.*—E. Dumand was admitted into the Hôtel-Dieu, in April, 1818. He was 20 years of age, of feeble constitution, tall, spare, and of bilious temperament; he followed the trade of a wheelwright. He had had from birth two little spots, commonly called *wine-marks*, on the outside of the concha of the right ear; but there was no deformity beyond a little thickening at the stained spots. The only inconvenience he experienced was an itching sensation, which led the child to scratch the part; whenever, in so doing, he injured the skin, scarlet blood flowed from the wound.

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[1] [Regarding the influence exercised on the brain by the sudden interruption of the current of blood through one of its supplying trunks, the reader would do well to consult more recent authorities.—T.]

At twelve years of age the ear began to enlarge, and changed its colour to a dark violet. In the course of three years more he was conscious of slight movement in the part, and the ear and spots had increased to twice their original size. Eight months after he first experienced pulsation in the part, hemorrhage was occasioned by an attempt to snatch his hat from his head, and was difficult to suppress. The patient was thereby reduced, but the symptoms were for a brief season ameliorated. They soon, however, assumed their former activity, and the youth was induced to abstain from any physical excitement, in consequence of noticing that the volume and pulsation of the ear were thereby augmented. Temporary benefit was derived from pressure on the affected part; but after the lapse of some months a second hemorrhage took place spontaneously, and stopped of itself. A third and fourth bleeding drove him to seek medical aid; and styptics and pressure were vainly tried in the hope of arresting the progress of the disease.

He then went to the Hôtel-Dieu at Sens, where, after an attempt to compress the supplying arteries, which could not be borne, these, viz.—the temporal, auricular, and occipital, were, at intervals, successively tied. But the relief was only partial and temporary, and the bleeding recurred. Lastly an attempt was made to tie the external carotid; but, in my opinion, it was only the dilated temporal branch that was taken up. Be that as it may, the result was not more encouraging than in the previous operations. The patient returned home; and the disease still increasing, he determined to come to Paris.

The diseased ear was twice as long as the other, and as thick as a finger; the helix and antehelix were obliterated. The whole ear was of a dark violet-red colour, soft and compressible; pulsation was distinct to the eye as well as the hand, the ear being raised, at each beat of the heart, from the side of the head. Nearly the whole of the hairy scalp covering the temple and occiput was of a bluish colour, and presented an uneven surface. Pressure on the common carotid arrested all pulsation in the tumid part, which became at the same time pale and shrunk. On removal of the pressure, the diseased tissue again became distended and red, and pulsated with even increased violence for a time. The part appeared to the patient to be hotter than natural; and the force with which the blood was injected into it was productive of even a painful sensation. His health, as well as his sight and hearing, was unimpaired.

Two distinct elements evidently co-existed in the formation of this diseased mass. One was developed in the form of broad, sinuous, irregular and knotty conduits which crept over the temple and ear, to which they imparted a wrinkled appearance. These conduits were full and compressible, and divided and subdivided, until they decreased from the size of the little finger to that of a crow-quill; and thus could be traced into the substance of the skin. The arrangement of these conduits and their synchronous pulsation with that of the heart, left no doubt as to their arterial origin. The other element was analogous in its structure to the normal erectile tissue, met with in the corpora cavernosa penis and other parts of animals;[1] and this filled the interstices of the network formed by the dilated arteries, and imparted the violet hue, the increased temperature, and other peculiarities noticed in the diseased mass. The hemorrhage was due to lesion of this element; and this accounted for the blood flowing instead of being emitted in jets.

The history and circumstances attending the case, proved to my satisfaction that nothing short of tying the common carotid would hold out any prospect of a cure; and I accordingly performed the operation on April 8th, in the following way. The patient being placed in a recumbent posture, an incision three inches in length was carried along the inner border of the sterno-mastoid muscle; and on this muscle being drawn outwards and the larynx inwards, the artery was readily exposed. A grooved director was first passed beneath it; and along this an appropriate needle, armed with a single ligature consisting of four threads waxed together, was introduced. After the experiment of drawing up the ligature so as to prove its power in arresting the supply of blood to the diseased part, and which was satisfactory, it was tied, without any other unpleasant symptom than a pain felt at the instant in one of the right bicuspid teeth. Though materially diminished in size, the ear did not shrink so much as was anticipated; this was attributed to the retention of the blood in the erectile tissue; but the pulsation had entirely ceased.

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[1] [An account of these normal tissues has been omitted.—T.]

The patient was wearied by having been subjected to examination and questions during the day; and to this I in great measure attribute a violent headache from which he suffered in the evening; he also had some numbness in the arm of the opposite side, and vomited his broth. He was bled, and had a mustard bath for his feet.

On the following day the headache had abated, but he again vomited; the mustard bath was repeated, and nothing but slops ordered. On the third day, these symptoms had nearly ceased: there was no pulsation in the tumour, nor in the arteries leading to it; the ear itself was diminished in size, but continued red and hot. On the tenth day, the size of the ear was reduced one third. On the twelfth, the ligature came away; an abrasion on the surface of the swelling, which bled before the operation, was suppurating kindly.

This favorable condition continued up to the eighteenth day, the erectile tissue continuing still to decrease in volume. Then, for the first time, a slight dilatation and contraction in this part was perceptible, although there was no pulsation in the supplying arteries. Careful compression was made on the ear. On the thirtieth day, these movements were visible. At the end of six weeks the patient had some constitutional disturbance, which, however, speedily subsided. The wound of the operation had then quite healed. At this period, and subsequently, various forms of compression were attempted, but ineffectually. Even a dense covering of plaster of Paris, applied when the ear was emptied of its blood, failed; for the expansive power of the tissue burst open the mould and broke it into fragments. The only remedy, extirpation of the diseased part, was forbidden in this instance by its extent. In fact, all had been done that could be done, in curing the aneurismal dilatation of the arteries; the remaining disease is of far less importance, and must be left to take its course, until the general powers of the system begin to fail, when this diseased tissue likewise may be expected to lose its active properties and to degenerate.

Case VII.—*Aneurism of the internal carotid, treated by ligature of the common carotid artery. Death.*—E. Gogue, aged 76, a widow, was admitted into the Hôtel-Dieu, in July, 1818. She was thin and feeble, and had been subject from childhood to palpitations and fainting fits, which recurred every four or five months. Eight years previously she first perceived a small lump behind the angle of the jaw on the left side; for a long time this did not sensibly increase, but during the last three months, it had grown so rapidly that she was induced to apply for surgical advice.

At the time of her admission, the tumour had attained the size of a young child's fist, and extended from the os hyoides upwards to the lobe of the ear, and from the angle of the jaw backwards to the posterior border of the sterno-mastoid muscle; it projected about an inch from the surface, and also backwards into the pharynx. Its outline was regular and oval, and its consistence soft and elastic It pulsated and expanded with each beat of the heart; but this pulsation ceased when the common carotid was compressed, and then the swelling diminished a little in volume. She swallowed and opened her mouth with difficulty; and the left half of the tongue seemed to be partially paralysed. Her rest was disturbed, but her health was otherwise good; there seemed to be no disease of the heart.

The inference drawn from these signs was, that some branch of the carotid was the seat of aneurismal disease; and the age of the patient rendered it probable that the whole arterial system had undergone some morbid change. I should remark that the patient complained of most acute suffering when the carotid was compressed above the clavicle.

There were many circumstances which seemed to forbid an operation in this case; but the certain, and probably early, fatal issue of the disease, determined me to give the patient such chance as surgical interference offered.

The patient was placed in the recumbent posture, with the shoulders supported. An incision, about two inches in length, was made along the anterior edge of the sterno-mastoid muscle, down nearly to the clavicle. The intervening tissues being divided, the artery was exposed below the omo-hyoid, and a single ligature was readily carried around it. Pulsation in the tumour immediately ceased.

No untoward symptom occurred during the day. In the evening the patient complained of great pain in the throat, for which she was bled and leeched, with relief. But two days later the wound assumed a grey colour; and subsequently constitutional disturbance ensued, and was succeeded by prostration, cough, and dyspnœa. She expired on the ninth day from the operation.

Autopsy.—The brain, which was carefully examined throughout, presented no trace of disease, either as regards consistence, the presence of pus, apoplectic effusion, or other evidence of inflammation, with the single exception of the lateral ventricles containing four ounces of bloody serum. The membranes of the cord were also healthy. The mucous surface of the whole intestinal canal, from the cardiac orifice of the stomach downward, was of an uniformly dirty grey colour, but otherwise unchanged. There was no recent morbid change in the lungs; but the left ventricle of the heart was considerably hypertrophied, and the orifice of the aorta was narrowed. The whole arterial system was more or less diseased, presenting the osteo-calcareous form of degeneration in various degrees; at some parts in smaller patches, and at the earliest period of degeneration; in others, the entire calibre of the artery was more or less encircled by cartilaginous or osseous rings; this was particularly remarkable about that part of the aortic arch which gives origin to the left subclavian artery.

On examining the carotid artery at the seat of ligature, it was found to be surrounded by a large abscess, the contents of which had only partially emptied itself by the external wound, the pus having also burrowed into the chest as low down as the posterior mediastinum. The oval aneurismal sac was developed from the outer side of the internal carotid, and appeared to have diminished in size since the operation. Above and externally, it was covered by the thinned sterno-mastoid muscle, beneath which, and farther forward, was the eighth pair of nerves and the internal jugular vein, the latter still pervious, though contracted. In front, the sac was covered by some branches of the cervical plexus and the platysma, and higher up, by the digastric and stylo-hyoid muscles. Internal to it was the external carotid and its branches, the ninth nerve, and the pharynx.

When the parts were removed, it was palpable that the tumour resulted from a rupture of the external wall of the internal carotid artery. The orifice in the vessel was two lines wide, and the edges of the opening could be traced for a short distance into the sac; the internal wall of the artery was quite sound. The interior of the sac presented several osseous incrustations, which no doubt originally formed a part of the wall of the artery. The sac, which was soft, contained some dark but recent coagula, and a small quantity of liquid blood. Where the ligature was applied on the common trunk, it had entirely given way at one point; but at other parts the continuity of the vessel was maintained by the integrity of the outer coat, the middle and inner coats having retracted to the extent of a line above the point where they were cut through. A small clot had formed below the ligature, and its upper extremity was covered by a pink layer of albuminous matter, the product of inflammation, which was in contact with the outer coat of the artery.

In both the inferior mesenteric and right common iliac arteries, there were small aneurismal dilatations, arising from the same cause,—viz., degeneration of the elastic coat of the vessels. The veins, as far as they were examined, appeared to be healthy.

This case illustrates, in an interesting manner, the origin of that form of aneurism which may be denominated "senile." The column of blood, acting on the deteriorated tissue of the middle coat, distends the outer coat, and this in turn gives way. The effects of the ligature corresponded with what experiment had shown before; and the presence of the clot proved the reparative effort of nature. If the operation had succeeded, the patient's life would have been prolonged; and this is a justification of its performance.

The following abstract of a case in which the carotid was tied, illustrates the occurrence of hemiphlegia after that operation.

A youth, aged 18, was admitted into one of the Paris hospitals, in 1834, with a pulsating tumour on the left temple, above the zygomatic arch. It had existed about fifteen months; pressure on the carotid arrested its beating. Opinions were divided as to the exact nature of this swelling, some thinking it aneurismal, others regarding it as an erectile tumour. The surgeon under whose care the case came adopted the former opinion, and determined to tie the carotid. Both common and external carotids were accordingly secured; and after this double operation the pulsation ceased. For six days all went on favorably, but on the seventh, after the separation of the ligature, bleeding came on; and this recurred seven different times. The patient's strength gradually gave way, and he expired a fortnight after the operation; hemiplegia of the right side having supervened a day or two before death. On examination of the body, the disease proved to be an encephaloid tumour, and no aneurism; the brain presented no morbid change to account for the hemiplegia.

The causes of death after ligature of the carotid are various. In a case related to me of a Russian soldier on whom this operation was performed for wound of the external carotid, the patient died after an attack of fever and delirium. In another case, on which I operated myself for hemorrhage coming on after a wound of the external carotid, the patient died exhausted in less than a week.

In speaking of aneurism of the lower extremity, I may remark that, with the exception of the external iliac, cases requiring operation here are much more frequent than in the upper extremity.

In comparing the case already described, in which I tied the subclavian, with the next to be narrated of the external iliac, many points of remarkable contrast present themselves in the details of each, although they both terminated favorably. But it is impossible to calculate on the course and issue of such cases with certainty; there are so many points associated with the condition and constitution of the patient, the history of the disease, &c., which frustrate the attempt to reduce the prognosis to a mathematical certainty. The result of the two cases alluded to would induce a conclusion that ligature of the external iliac is fraught with much more risk and difficulty than that of the subclavian; whereas, it is found to be generally the less difficult of the two, and not attended with more danger.

Different modes of operating, in placing a ligature on the external iliac artery, have been proposed. The first consists in dividing the abdominal parietes perpendicularly, in a line extending from the outer border of the rectus muscle to the point at which the artery passes beneath the crural arch. In the second method, that of Abernethy, the incision is made in the course of the artery, and straight; whereas, in Sir A. Cooper's operation, a semicircular incision is made, commencing near the anterior superior spine of the ilium, and terminating a little above the abdominal ring. This last mode of proceeding is to be preferred, not only on account of the facilities it offers for the performance of the operation, but also because the peritoneum is thereby more secure from the risk of injury. Care, however, should be taken not to extend the incision too far inwards, so as to approach the ring, as the epigastric artery would be thereby endangered. It is easier to tie the external iliac in females than males, as the artery is less deep. An accumulation of fat naturally enhances the difficulties of the operation.

Case VII.—*Ligature of the external iliac artery.*—F. Berger, aged 45, formerly a soldier, but latterly a stone-cutter, of good constitution but irritable temperament, was in the act of lifting a plank, the corner of which rested on his groin, when he experienced a sharp pain there; but its transient nature did not interrupt his occupation. Two months afterwards, he perceived a lump, as big as a nut, in the groin, about two inches below Poupart's ligament; but he took no heed of it. A twelvemonth afterwards, on making an effort, the tumour suddenly attained the size of a hen's egg. Lastly, three weeks before his admission into the hospital, he fell on the edge of a large copper pan, his whole weight being received on this unfortunate tumour, which increased so much that he was sent to the Hôtel-Dieu.

On his admittance (August, 1816), the tumour in the groin was of the size and shape of a large pear, with its base above, and extending a little above the crural arch. It alternately expanded and contracted at each pulsation of the heart; and these movements ceased on arresting the course of the blood through the artery to the tumour. When the sac was partially emptied, its parietes were felt to be hard and irregular. It was determined first to try pressure and the application of ice before having recourse to the ligature.

In the first instrument which was constructed with this view, the fulcrum or point of counter-pressure was the sacrum, and the vessel was compressed against the pubes with the aid of a pad acted on by a screw. Ice was applied over the tumour in a bladder. Excruciating pain was, however, occasioned, and the patient could not bear the interruption of the circulation for more than twenty minutes at a time. Subsequently, a better contrivance was adopted, by which the movements of the body did not influence the pressure. This was more on the principle of a truss, and was very efficient, insomuch that the tumour very sensibly diminished whilst it was employed. But the patient, after a few days, became irritable under the pain, and refused to submit any longer to this treatment, urgently begging for the operation. Accordingly, after suitable preparation, his wish was complied with.

The patient was placed recumbent; and I commenced the operation by carrying an incision from a point an inch below and before the spine of the ilium, to the outer border of the crural ring. The skin and muscles being successively divided, the areolar tissue around the vessels was exposed; this proved to be remarkably dense, and contained a considerable number of lymphatic ganglia, so that there was some little difficulty in passing this ligature beneath the artery. This was ultimately effected about an inch above the tumour; and another reserve ligature was introduced about half an inch higher up. When the knot was tightened all pulsation in the sac ceased. During the progress of the operation, the patient made an effort by which the edges of the wound were almost approximated, and the bulging of the intestines endangered the peritoneum. The interposed hand of an assistant obviated these difficulties.

Judging by the similar operations on the subclavian artery, I anticipated a favorable progress and speedy cure, but was disappointed in both expectations. I will refer to the various drawbacks which occurred, as illustrating the importance of judicious after-treatment as well as skilful manipulation.

The patient bore the operation without a murmur, but afterwards felt sick and faint. He was well supported in bed, with his thighs bent on his pelvis, and the affected limb enveloped in bags of ashes and hot cloths. There was neither numbness nor loss of muscular power in the extremity through the day, and the temperature continued unabated; indeed, to himself the limb on the affected side seemed hotter than the other, though this was not really the case. He complained of pain in the epigastric region, and had continual eructations of gas. In the middle of the day there was considerable excitement of the circulation; and he passed a sleepless night. He had nothing but slops.

On the second day the local symptoms were unchanged, except that the limb appeared to have acquired an unnatural temperature; it was, therefore, more lightly covered. The stomach continued distended with flatus. The face was shrunk, and the lips and tongue were covered with a dry and dark coating. An injection of tamarinds in water produced a slight feculent evacuation, with much gas, and relieved him. But subsequently the pain, distension, and febrile excitement increasing, he was bled; and afterwards slept. In the evening he wandered a little; and the excitement of the circulation returning, he was again bled, and injections were repeated.

On the third day there was general improvement; but the bowels did not act, notwithstanding the use of castor-oil injections.

On the fourth day there was still further improvement, and it was followed by a night of sleep.

On the fifth day the wound was dressed. Suppuration profuse. A small dark spot was perceptible at the outer angle of the wound, probably occasioned by pressure. The tumour was reduced to one third of its former size; and there was no pulsation either in it or the arteries below. He was allowed at this time broth and lemonade. The pain in the epigastrium had subsided, but the eructations continued; and his tongue was red and dry, and his pulse frequent. He was also troubled with a slight cough. During the day he became slightly delirious; this ceased after a copious dark motion, which was brought away by injection.

On the sixth day the pulse was quick, and the tongue dry and brown. There was perceptible, for the first time, a slight tremor in the tumour. A little beer was allowed him. He passed a better night.

On the seventh day there was further improvement; and several copious, liquid motions were passed. He had some appetite. The wound was suppurating healthily. The tumour pulsated perceptibly both to the touch and eye, on the eighth day; and this increased on the ninth day, attended by pulsation in the abdomen, associated apparently with the trunk of the artery above the ligature; but the tumour had further diminished in size.

During the four succeeding days nothing particularly worthy of notice occurred, except that the patient had troublesome hiccup. His diet was improved.

On the fourteenth day the pulsation above the tumour ceased; and that in the sac itself was irregular and intermittent;—a peculiarity confined to this spot, as it was not perceived in any artery at other parts of the body.

On the sixteenth day, both the ligatures came away spontaneously. The reserve ligature formed a small loop, the borders of which were cemented with dried pus; that which was tied tightly presented but a small ring, but containing no trace of the divided artery.[1]

The improvement, both local and general, continued up to the evening of the twenty-third day, when, after much restlessness and the appearance of some streaks of blood in the pus, hemorrhage occurred, but soon ceased; so that when the dressings were removed, its source could not be detected.

On the following day, the twenty-fourth, there was a second and more profuse bleeding, accompanied by sharp pain in the wound; the blood did not come in jets, but was unquestionably arterial. Pressure made an inch above the wound produced no effect; but when applied below the wound, the bleeding stopped. A compress was accordingly fixed in this position. The patient's face, however, betrayed the effects of the loss of blood, and eructation had again commenced.

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[1] I never used the reserve ligature after this occasion. Experiments have satisfied me, that there is greater risk of inducing hemorrhage than of preventing it by their use; and that they cannot arrest bleeding, as the inflamed portion of the artery on which such ligature would act, would readily yield under the pressure and give way.

It was perplexing to comprehend whence this bleeding arose. When the artery was tied, it was distinctly seen, and the pulsation in the sac ceased for six days. But subsequently, when pressure was made on the artery above the seat of ligature, it did not control the circulation through the sac. Its supply must, consequently, have been obtained from a more distant source. Compression of the abdominal aorta, indeed, stopped the pulsation; I therefore concluded that the collateral circulation was established through the medium of the communication between the internal iliac and internal mammary arteries. Still the question arose, as to how the blood found its way into the sac itself, as the femoral artery did not pulsate below it. This, I conjectured, must be through the anastomosing branches of the epigastric with the internal mammary; and, in tracing the course of the former vessel, this was proved by the distinct and well-defined pulsation which could be felt, through the abdominal parietes. Thus, so far from there being any cause for apprehension that the collateral circulation would be deficient, its freedom was the source of all the existing inconvenience and risk, which bid fair to render the operation abortive.

What, under these circumstances, was to be done? I could not tell how far the profunda artery might aid in supplying the sac; and, moreover, it seemed reasonable to believe that the blood entered it at its lower extremity. The alternative of searching for and tying the supplying vessels, or that of laying open the sac itself, was not to be entertained, on account of the difficulty and risk attending such modes of proceeding; I therefore determined to employ pressure, and this was applied below the wound, for it was useless higher up. During the day, hemorrhage occurred two or three times; and at last was arrested by pledgets of charpie being passed down to the bottom of the wound and firmly fixed there. The thigh was plexed on the pelvis, and lemonade with wine was allowed him in addition to his broth.

On the twenty-fifth day, the dressings were moistened with fresh blood, and were removed. The limb retained its temperature and natural functions. Fresh discharge of pus soon took place from the wound, and he improved. But, on the thirtieth day, restlessness induced another bleeding. Again fresh pledgets were applied; and an improved diet was allowed. From this time there was no further hemorrhage; and a few days afterwards the compress and pledgets were removed. It was then ascertained that the sac was emptied of its contents, and that all pulsation had ceased. Indeed I had little doubt then that the sac had burst, and that the clots which had been removed from the wound had been discharged from it. Still there was much constitutional disturbance, which lasted some days, when a fluctuating swelling appeared below the sac. This was opened, and a quantity of fetid and thin pus escaped. Shreds of tissue were subsequently discharged, and the opening was extended to facilitate their exit.

The patient subsequently suffered from nervous pains and other depressing symptoms; and it was not till he got change of air and of scene that he rallied. At the end of two months he was convalescent. Eleven years afterwards he was seen quite well, and following his laborious occupation as a mason.

CASE VIII.—*Aneurism of the external iliac artery. Death.* —The following case illustrates the importance of exercising discretion in the performance of serious operations, that discredit may not be unjustly attached to the science of surgery, which is due only to the operator. A man, 45 years of age, tall and of feeble constitution, and occupied as a nightman, was admitted into the Hôtel-Dieu, in October, 1828. Three weeks previously he had felt, without any apparent cause, a violent pain reaching from the groin to the lower part of the thigh, which was soon followed by a sensation of numbness and cold. Exertion distressed him, and he was soon laid up. He had long been subject to a cough, and had suffered from the venereal disease, from œdema, and ulcers of the legs.

On examination, a rounded tumour, of the size of an egg, was perceived in the left iliac fossa, pulsating with the heart, and yielding to the ear a whizzing sound; the pulse was irregular, but the heart's impulse moderate; though the abnormal sound caused by the passage of the blood through the arteries seemed to indicate a diseased condition of these vessels.

Now the external iliac artery had been tied in several instances, but always for aneurism, situated in the groin, or at most, only partly above Poupart's ligament. But, in this case the sac occupied the position at which the ligature was applied in the instances referred to; and, moreover, the precise limit of the tumour was not defined. The whole space traversed by the external iliac artery does not exceed, at most, four inches; and in this course it gives off but two branches, the epigastric and circumflexa ilii, and these very close to the crural arch. Assuming that the aneurism sprung above the origin of these branches, there was but a small space left for operation between it and the bifurcation of the common iliac; and it is to be borne in mind, in contemplating an operation of this sort, that the proximity of a large trunk interferes with the formation of a clot in the interior of the vessel, which is so essential to the process of obliteration.

Aneurisms in this part of the external iliac are rare. Béchard mentions having met with two such instances, after death, which had not been suspected during life; and in which nothing short of a ligature on the common iliac trunk would have afforded a chance of success.

But, supposing there had been, in this case, room to tie the external iliac, how was I to proceed, Sue, formerly Librarian to the Faculty, was the first to point out the practicability of this operation. Marc Séverin records a case of spontaneous cure, following gangrene, which involved the entire sac; and Gualtari cites a similar one. Massinini having opened an aneurism of this kind, emptied the sac, plugged it with charpie, and then applying firm pressure, had the good fortune to cure his patient. In 1796, Abernethy first tied this artery, but unsuccessfully: he also lost his second case; but his third succeeded. Since then the operation has been often repeated, and the proportion of successful cases has been about two thirds of the whole number.

Had I operated in this case, I had determined on making my incision farther outwards than midway between the spine of the ilium and pubes, and for two reasons. The epigastric artery is thus avoided, and the peritoneum is more easily raised from the iliac fossa. But I did not operate, because it was impossible for me to determine the limits of the tumour, which might have extended upwards, for aught I knew, so as to involve even the common iliac; and, moreover, the separation of the peritoneum, supposing it to adhere to the sac, as it probably did, would be no easy task. Lastly, the general health of the patient, together with the physical signs of diseased heart and arteries, altogether forbade the operation.

The issue proved the propriety of adopting this decision; for the constitutional disturbance increased during the following month, after his admission, and he sank rapidly.

Autopsy.—There was hypertrophy with dilatation of the left ventricle: the mouth of the aorta was dilated, and the interior of the vessels presented several rough patches of a yellow colour. The lungs were shrunk, and exhibited old adhesions. The abdominal aorta was healthy. On the outer side of the external iliac artery, a little above the origin of the epigastric, there was a rounded aperture, about three lines in diameter, which communicated with an aneurismal sac, situated in the iliac fossa. The parietes of this sac were not very dense, and were cellular. At its upper part there was a gap, permitting an extension upwards of the cavity, as high as the left kidney; this appeared to form an appendix to the main sac; and both were filled with dark, irregular clots, not such as are found, deposited in a laminated form, in the interior of old aneurisms. The remaining portion of the external iliac artery was of normal calibre. The femoral artery was studded with cartilaginous patches, and the accompanying vein was dilated, and its coats thickened. The neighbouring lymphatic ganglia were enlarged, and otherwise diseased. The peritoneum proved to be adherent to the sac. There was purulent effusion into and about the knee-joint.

Next to aneurism of the popliteal artery, probably that of the femoral is more frequent than any other. The following case will serve as an illustration of the disease and its cure.

Case IX.—*False consecutive aneurism of the left femoral artery.*—J. F. Brozard, a servant, 37 years of age, was admitted in the Hôtel-Dieu, in May, 1819. About two months before, when striding across the trunk of a felled tree, he was struck on the lower and inner part of the left thigh. The contusion was apparently slight, and no ecchymosis followed; and three weeks elapsed before he perceived a small, pulsating, and painful tumour at the spot. At first, he paid no attention to it, but continued to exert himself as usual, which increased the size of the swelling, and the force of its pulsations. He then came to the hospital.

On examination, a tumour was found at the lower part of the femoral region, just where the artery is entering the canal formed by the adductors and vastus internus muscle. Its size was equal to that of two fists. The superjacent skin was thin but not discoloured: the tumour pulsated with the heart. The affected limb was somewhat wasted; and walking gave him pain; there was some numbness of the toes.

The pulse could be felt in the arteries below the knee. Pressure on the femoral artery arrested the pulsation in the tumour.

As I had cured several cases of both femoral and popliteal aneurism by compression, I determined to try it in this case. But, although the artery was thus commanded, the pain occasioned by the pad was such that it could not be borne; and, moreover, the skin became inflamed at this spot. I therefore determined to tie the artery.

The thigh being abducted, and the leg flexed, I cut down on the artery at the inner border of the sartorius; and having exposed it, I passed a grooved director beneath the vessel, and along it was slipped a stylet armed with a silk ligature. When I had ascertained that the flow of blood to the tumour was cut off by pressure on the artery, I tightened the ligature, and dressed the wound. Cold applications were employed to the sac; and the half-bent limb was surrounded by hot sand-bags.

The limb retained its heat and sensibility through the day; indeed, the heat was somewhat augmented. In the evening he was bled; a precautionary measure, had recourse to in consequence of the patient being frequently subject to epistaxis. His bowels were sluggish, which is often the case where a large arterial trunk is tied. A purgative was therefore administered. The progress of the patient was uninterrupted. The ligature came away on the fifteenth day; on the thirty-fifth day the wound was quite healed. This patient left the hospital quite well; the tumour being reduced to one fifth of its former size, and the artery obliterated to the extent of about three inches above where the ligature was applied.

The success attending the operation of tying the femoral artery is probably in great measure due to the facility of exposing and isolating this vessel. In some instances, partial gangrene, as of the toes, has followed the operation; but this does not constitute an obstacle to the cure of the disease.

The frequency of aneurism in the popliteal artery has been noticed and accounted for by most authors. But there is one exciting cause which has not been mentioned, I mean the act of drawing on tight boots. The forced extension of the leg produces pain in the ham, which does not subside for many hours.[1] The operation of tying the femoral artery for this form of aneurism does not differ from that just described; but the narrative of a case will make the subject more complete, and afford me the opportunity of noticing the characteristics of aneurism at this part of the artery.

CASE X. — *Aneurism of the popliteal artery, cured by ligature.*—F. Coulé, aged 45, employed in the Venereal Hospital, was admitted into the Hôtel-Dieu, in June, 1819, with secondary false aneurism of the left popliteal artery. Four months previously, he exerted himself violently in lifting a stone, and a fortnight afterwards perceived a swelling as large as a nut in the ham: it pulsated, and pain extended from it even to the toes. At first, he did not heed these symptoms; but as the disease increased, he applied to the surgeon of the hospital to which he was attached. The nature of the malady having been detected, an attempt was made to arrest its progress by the employment of pressure; and an apparatus was contrived for the purpose, consisting of two plates connected by two straps, and in the centre of that which was placed over the artery a pad was fixed, which could be tightened or loosened at pleasure by a regulating screw: the plates were sufficiently broad to obviate, as far as possible, interference with the circulation by undue compression on the sides of the limb. This apparatus was applied, and gradually tightened, so as to obliterate the calibre of the artery, at the same time that general antiphlogistic measures were employed. But, notwithstanding all the precautions that were taken, the part on which the pad pressed mortified; and when the slough was thrown off, a long time elapsed before the wound was healed. When an attempt was made to reapply the pressure, the suffering it occasioned was so severe that it could not be borne. The tumour, however, had evidently diminished, both in size and in the force of its pulsations. The patient was then sent to the Hôtel-Dieu, when the following appearances presented themselves.

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[1] [It does not clearly appear whether this assigned cause of popliteal aneurism is given on the authority of Dupuytren, or of his Editor.—T.]

The tumour in the left ham was about the size of a hen's egg, pulsating with the heart. The superjacent skin healthy. The affected leg wasted, feeble, and numbed; the posterior tibial still pulsated. Pressure on the femoral artery arrested the pulsation in the sac, as well as diminished its volume; but the tension and impulse were again restored as soon as the pressure was removed.

The compression had been tried in the ham before the patient's admission, and it was now applied to the middle of the thigh, assisted by pressure at the groin; but it could not be borne, and, after a week, was desisted from, as the skin became inflamed. The operation of tying the artery was accordingly determined on, and performed in a way similar to the last case, and without difficulty,—a single ligature being employed. The same precautions were taken to preserve the temperature of the limb, and with success.

On the day succeeding the operation, there was some constitutional excitement, accompanied by palpitation. For this he was bled, with relief; subsequently a little digitalis was given, and the palpitation ceased. The ligature separated on the twenty-fourth day, and the patient quitted the hospital at the expiration of three months, quite well. The size of the tumour was diminished by two thirds, and pulseless. The obliteration of the artery extended for about four fingers' breadth above the seat of ligature.

Case XI.—*True aneurism of the right popliteal artery, treated by ligature of the femoral artery, and followed by gangrene.*—Car. . . ., aged 35, a clerk at the Barriers, of middle size, and not strong, had had his constitution enfeebled by excessive hardships, labour, and privations. He had taken mercury for some syphilitic affection, and had also been the subject of glandular enlargement in the neck. At 32 years of age he suffered from dyspnœa and palpitation, for which he was frequently bled. During a long journey, he experienced pain in the right ham, and on his arrival in France, he perceived strong pulsation in the part, accompanied by shooting pains down the leg. These symptoms increased in spite of palliative treatment, and he came to the Hôtel-Dieu five months afterwards, in February, 1829.

The heart's action was strong and loud, and a bellow's sound was distinctly audible along the course of the aorta. The popliteal tumour was oblong, and of the size of a small egg; and there was much tenderness in it, which extended along the course of the external popliteal nerve; the other ordinary physical signs of aneurism were present, including œdema of the foot and leg. He was pale, thin, and flabby in flesh, but otherwise appeared in tolerable health. After a few days of preparation by bleeding and a purge, the femoral artery was tied. Some small arterial twigs required ligatures, the application of which gave him great pain; but not so when the trunk was tied.

Two hours after the operation, he complained of numbness of the leg, and of a burning pain which extended from the outer side of the thigh to the foot; the temperature, however, was rather below the normal standard. In the evening, he experienced a sense of pulsation round the patella, but the tumour had shrunk and was pulseless. The circulation was excited, and his face flushed. He was bled, and had some sleep.

On the following day his general condition was somewhat improved, but the burning pain continued, and the temperature of the limb had rather diminished. He was ordered an anodyne mixture and broth; and precautions were taken to secure the proper temperature of the leg.

On the third day the pains were less, but the thigh was a little swollen, and there was general prostration, accompanied by profuse sweats. He had epistaxis during the day; and was bled in the evening. During the night he fainted twice.

On the fourth day the tumour continued pulseless. The skin of the extremity was, throughout, warm and sensible; the wound looking well. An erysipelatous blush had exhibited itself on the upper and outer part of the thigh. The pulse continued high, but there was no evidence of congestion in any organ, the thigh and leg were enveloped in a poultice.

There was some general improvement on the fifth day; but on the sixth the foot began to lose its temperature and sensibility, and became œdematous; at the same time there was a restless expression in the patient's face. Anodynes and support were continued.

On the seventh day the signs ushering in gangrene became more marked. He was restless and feverish, and complained of burning heat and pricking pain in the limb; the foot was chilled, and its sole soft, swollen, and infiltrated. Some spots of ecchymosis were noticed on either side of the tendo Achillis. Stimulating liniments, warmth and friction were employed.

Until the twelfth day there was very little change beyond the extension of the sphacelus in the foot and leg, though the muscles were not yet involved. A large quantity of not unhealthy pus escaped from the thigh when an incision was made in its upper and outer part.

On the nineteenth day the ligature came away without hemorrhage. From this time there was very little change in the general state of the patient until his death, which occurred from exhaustion on the twenty-sixth after the operation. The foot was in a state of dry gangrene, and there was no indication of a line of demarcation between the living and dead parts.[1]

Autopsy.—The lungs and brain were healthy. There were two living tape-worms in the small intestine, each more than eight feet long; there was no inflammation of the mucous membrane in their neighbourhood. There was excessive hypertrophy of the left ventricle, but the valves and endocardium were healthy. The aorta was dilated, and covered with patches of atheromatous degeneration; but there was no ossific deposit. In the femoral artery which had been tied, there was a fibrinous clot, about three quarters of an inch long, and truncated at each extremity, but tapering in both directions towards the centre where the ligature was applied; the lining membrane alone of the vessel appeared to be cut through. In the sac, all the arterial coats seemed to be entire, except at the lower and outer part, where the lining membrane alone seemed to have given way. The popliteal vein adhered firmly to the sac, and was obliterated at this spot. Pus was effused around the femoral artery and amongst the muscles.

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[1] It should be remarked that this patient stated, on his admission, that his mother has a very strong pulse, and bled profusely when she had a finger amputated.

It may be interesting, in connexion with this subject, to narrate an example of the old practice of cutting into the sac of an aneurism, and tying both extremities of an artery. The notes of the following case were taken by myself some years since.

Case XII.—*Popliteal aneurism treated by incision, terminating fatally.*—P. L. Bordier, aged 48, of middling stature, and bilious temperament, had always enjoyed good health till two years back, since which time he had been troubled in passing his water. Between two and three months ago he had two accidental falls, but they were not attended with any apparent injury to his leg. He, however, discovered, a fortnight afterwards, a small pulsating tumour in the ham. This increasing, he came to the Hôtel-Dieu, in September, 1806. The tumour had at this time assumed considerable size, and presented, well-marked, all the usual characteristics of aneurism. An operation was decided on and agreed to by the patient.

When brought into the theatre, he was placed in the recumbent posture, on his belly, and the femoral artery was commanded by a large compress, and a bandage over it which could be tightened by twisting a stick attached to it above. A longitudinal incision of about four or five inches was carried along the back of the ham, and the sac exposed; the second cut laid open the sac which yielded a jet of arterial blood. When this opening was enlarged, its contents, almost wholly fluid blood, were cleared out. It would have been easy to have discovered the extremities of the artery by introducing a probe into their communication with the sac; but the patient and surgeon were both badly placed for this purpose; and, moreover, the small external incision and opening into the sac further perplexed the operator, who sought in vain for the precise spot he wanted to find. I relaxed the pressure, and even pointed out the arterial opening, yet without avail; but the operator, provided with an immense curved needle, tried by the guidance of his finger only, to pass a double ligature around the artery. This attempt failed, as was proved by loosening the tourniquet; but a second succeeded, the needle this time being passed an inch higher up. The tightening of the ligature occasioned great pain. The sac was then examined more leisurely, and found to occupy the whole popliteal space, distending the muscles on each side. The course of the artery could be readily traced to its point of laceration. After emerging from the opening in the adductors, it took an almost transverse direction outwards, and then ran along the outer wall of the tumour; at the lower part of this course the laceration was situated, and the vessel soon afterwards resumed its normal position. The operator now considered his work done; and it was with much trouble that I persuaded him to apply another ligature on the lower extremity of the artery; and this was accomplished after several attempts, with the needle as before; but I could not induce him to place another reserve ligature on the upper part of the artery. He then plugged the sac with at least a pound of coarse lint; and feeling secure that no bleeding could now occur, he satisfied himself with a loose bandage round the part. This dressing was by far the most painful part of the proceeding. The patient was carried to bed, and the limb was only lightly covered.

At first the limb felt cold, but recovered and retained its temperature afterwards. On the second day there was serious constitutional disturbance, accompanied by cough and expectoration tinged with blood. On the third day he seemed to rally a little; but on the fourth he was evidently sinking. His suffering was extreme, and the limb became enormously swollen; he died in the evening. The dressing in the sac was not disturbed.

Autopsy.—The affected limb was livid. The internal articular arteries were large, and one above communicated freely with that below and with the recurrent tibial branch, by which means the injection found its way into both the lower part of the popliteal and the tibial arteries. The outer articular branches were much smaller. The ligature first applied had been carried through the artery. The second ligature included the artery, and with it the popliteal nerve. It was impossible to determine the precise spot at which the third ligature had been applied. The femoral artery was otherwise healthy, but the aorta was extensively diseased. The other organs were healthy.[1]

The case which I shall next cite, illustrates the risk of secondary hemorrhage, even at a considerable interval after the application of a ligature.

Case XIII.—*Ligature of the femoral artery. Secondary hemorrhage, and death.*—J. F. Denis, aged 31, was admitted into the Hôtel-Dieu, in March, 1811, with an aneurismal swelling in the left ham. The disease dated back only two days, and was attributed to a forced extension of the limb in a fall he had sustained. The operation of tying the femoral artery was immediately decided on, and performed by M. Pelletan. For a considerable time the vessel could not be found, and then only by drawing inwards the sartorius muscle. Extreme pain was experienced when the ligature was tightened, and this was ascribed by M. Dupuytren to the saphenus nerve being included.

Nothing worthy of note occurred during the first twelve days. On the thirteenth, the ligature came away. On the following day there was some trifling bleeding, for which another ligature was applied an inch higher up. After the lapse of three more days, there was further hemorrhage, which was stopped by a compress on the wound. Still the bleeding continued, and the operator applied another ligature a little below the groin, when the hemorrhage recurred, it was from the middle of the original wound, and Pelletan, supposing it to come from the profunda artery, plunged an aneurism needle to the bottom of the wound, a little above the spot whence the blood proceeded, and was fortunate enough to seize the vessel, as there was no more bleeding. Two days afterwards, the limb became œdematous, and the patient sank exhausted.

When examined, after death, the limb was found livid, swollen and tense; and gangrenous near the wound and along the outer part of the thigh. The whole extent of the enormous wound, and the surrounding muscles, were infiltrated with fetid pus. The two extremities of the artery were four inches apart; and the upper part appeared to have been opened at various points in the different operations. The highest ligature was applied a little below the origin of the profunda, and included the sartorius muscle and a part of femoral artery through which it was passed.[1] The aneurism was not larger than a walnut, and consisted of a dilatation of the external coat of the artery, containing a fibrinous clot.

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[1] [This case has, like many others, been considerably abridged; and its critical tone qualified rather than exaggerated.—T.]

The occurrence of hemorrhage in this case, after the lapse of a fortnight and the separation of the ligatures, and without the development of anything in the condition of the patient which could have led to such a result, is remarkable. As regards the repetition of the operation, it is probable that well applied compression would have been effectual in stopping the bleeding; at any rate, the course pursued illustrates the fact that it is useless to apply a ligature on an artery which inflammation has rendered friable.

It is scarcely necessary now to insist on the advantages of Hunter's operation of tying an artery above and at a distance from the aneurismal sac which it supplies, as compared with the older method of cutting down on the tumour, and emptying it of its contents, after placing a ligature above and below it. But it is interesting to remember that even anterior to this period, Aëtius describes a similar operation, with the superadded step of tying the artery (the brachial) above and at some distance from the aneurism.[2]

It remains for me to notice the operation of tying an artery between the aneurismal sac and the capillaries. This plan was suggested by Brasdor, but was first put in practice on the living subject by Deschamps, who tied the femoral artery for aneurism at the groin. He was, however, obliged afterwards to open the sac, and tie the artery above it, in consequence of the rapid extension of the tumour, and the impending risk of its bursting. But the operation was badly performed, as some muscular fibres were included in the ligature, and the profunda was perforated: the patient survived only eight hours. This was followed by a failure in a case operated on by Sir A. Cooper, and for a season discredit was thrown on the operation, until resuscitated at a later period. The chances of succeeding would appear to depend on the absence of any branch, of sufficient size to carry on the circulation, being given off between the seat of ligature and the sac: yet even this does not appear to be an essential element of success.[1] It is evident that this mode of operating is applicable only to circumscribed or spontaneous aneurism. In reckoning up the points in favour of this method of operating, it will be found that where no branch existed between the ligature and the sac, three cases out of five were successful; and that where the contrary arrangement obtained, the greater number of aneurisms, especially in the iliac region and groin, have not been at all arrested in their development. In some others, and more particularly in the lower part of the neck, the disease has not only been retarded in its progress, but modified altogether for a period extending from eight months to two years. I will close these observations with a case which is interesting in its details, though it unfortunately terminated fatally.

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[1] [This seems so incredible, that the original is appended. "La ligature la plus élevée . . . . . comprenait le muscle couturier, et une partie du calibre de l'artère crurale, qu'elle traversait."—T.]

[2] [For an account of these operations, the reader may consult the valuable translation of the works of Paulus Ægineta (vol. ii., p. 310), issued by the Society.—T.]

CASE XIV.—*Ligature of the axillary artery for subclavian aneurism.*—C. Pâris, aged 40, a country labourer, of good constitution, felt a pain in his right shoulder, after some violent exertion; and on the third day a pulsating tumour of small size was discovered above the clavicle. This occurred five months before his admission into the Hôtel-Dieu. When admitted, the aneurismal tumour occupied the whole subclavicular space and the lower third of the neck, raising the sterno-mastoid muscle. It pulsated strongly, though evidently bound down by a resisting membrane. The carotid of the same side could be traced down, though not to its origin, until the tumour was pressed downwards and outwards. At the upper border of the sternum, and in front and to the right of the trachea, a large arterial trunk was felt, which was probably the brachio-cephalic. The right arm and hand were œdematous and numbed, and the fingers were almost immovably semiflexed. The patient's general health was good, and the heart's action healthy, though forcible.

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[1] The reader is referred to an interesting and successful case, narrated, with remarks on this mode of operating, by Mr. Wardrop, in the 'Medico-Chirurgical Transactions,' vol. xiii, p. 217, as well as to his work on the same subject.

At first he was bled, and kept on a low diet, and pounded ice was applied to the tumour; but still the disease advanced. It therefore seemed necessary to perform some operation to afford the patient a chance of recovery; and, as it could not be ascertained whether the brachio-cephalic was not implicated, I determined to tie the vessel on the capillary side of the sac. An incision was made parallel to the clavicle, and about two fingers' breadth below, commencing near its sternal extremity, and extending three inches outwards. The great pectoral muscle and upper third of the smaller pectoral were successively divided; and when the axillary artery was isolated, a ligature was passed around it and tightened, without pain.

Immediately after the completion of the operation, the pulsation in the tumour was increased in intensity and irregular; but these symptoms speedily subsided. Ice was applied to the tumour, and a sedative administered. Ten hours after the operation, the pulse being strong, the patient was bled.

On the second day he was restless and weak. Pulsation in the tumour had not diminished, but the tension was less; the arm was warm. On the fourth day there was but little change; he slept more, and the pulsations were diminished in force. He was allowed a little broth.

On the sixth day bleeding came on, and recurred at intervals. He was bled from the arm three times during this day. Trifling hemorrhage again on the seventh day. The patient was now much reduced. Acetate of lead had been taken, but was now omitted. On the eight day he was again bled from the arm. The constitutional disturbance and feebleness increased, and he died on the ninth day.

Autopsy.—There was considerable emaciation. The right arm was livid and œdematous, and the fingers were black. The back part of the right lung was hepatized, and exhibited traces of recent inflammation. The heart was large and flabby; the ventricles being dilated, but soft and thin. The thoracic aorta was unnaturally large, especially at its origin. Its interior exhibited both cartilaginous and osseous deposit in patches.

The brachio-cephalic artery was also dilated, and similarly changed internally: the right carotid was healthy.

The aneurismal sac, which was formed by the dilated subsclavian artery, extended over the brachial plexus of nerves, and was covered by the sterno-mastoid, omo-hyiod, and anterior scalenus muscles; the latter muscle effectually obstructing the development of the sac towards the heart; and yet the first rib was almost entirely destroyed by the pressure. The parietes of the sac were tolerably thick and resistant, except at some points below, where the pleura alone formed the wall. The cavity of the aneurism contained only a loose clot of recent blood. The vertebral, internal mammary and thyroid branches were completely obliterated. The axillary artery was healthy where the ligature was applied, and contained a small clot above this point. There was an opening, at the seat of ligature, into the artery; but this appeared to have been done in dissection, or by pulling at the ligature,—an experiment which the pupils had freely indulged in before the *post-mortem* examination was commenced.[1]

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[1] [It is scarcely necessary to follow the French editor through the remarks which are appended to this case, nor to criticise treatment, which could scarcely be expected to conduct to any but a disastrous issue. Indeed, it is implied, if not admitted, that the operator himself was of opinion, that the repeated abstraction of blood from the arm hastened the fatal termination. The hemorrhage was supposed to be caused by ulceration of some undiscovered small branches, and not from the rent artery.—T.]

SECTION IV.

ON FALSE ANEURISM OF THE BRACHIAL ARTERY, AND VARICOSE ANEURISM.

The operation of bloodletting is generally regarded as too simple to merit special attention; and thence have arisen the accidents which I have so often witnessed during the last ten or fifteen years. Multitudes of hospital students neglect this operation; and we constantly see instances in which the skin over a vein is repeatedly punctured before the vessel itself is opened. To such ignorance or carelessness we may also ascribe the many cases of phlegmonous inflammation and phlebitis which occur,—a result which is, no doubt, likewise due to foul lancets. But, above all, the neglect of which I have been speaking, tends to the serious consequence of varicose aneurism, consequent on puncture of the brachial artery through the vein,—an injury of which examples are brought under my notice repeatedly. Very simple precautions suffice to prevent this mischief; and the following axioms should be constantly acted upon: 1. That a vein should never be opened in the arm until the pulsation of the artery has been felt for; 2. That the vein in front of the vessel should never be selected, but that others should be sought, albeit they be difficult to find, and yield blood more sparingly.

False aneurism, the result of wound, does not always manifest itself immediately after the injury, but occasionally some little time elapses before it becomes apparent; and this difference gives rise to the distinction into *primitive* or *diffused*, and *consecutive* or *circumscribed* aneurism. Some instances are recorded in which a small clot has for a time plugged a wounded artery and prevented the escape of blood; but on its expulsion by some effort, or the force of the circulation, a circumscribed false aneurism has resulted.

True aneurisms of the brachial artery at the bend of the bow are very rare; but this cannot be affirmed of false urisms at this part, for the reasons already assigned.

Galen, Celsus, and Aëtius describe them, and notice the means of cure. It is, indeed, surprising that operations of this kind should have been performed without leading to a knowledge of the laws of the circulation; and it was not until Hunter's time that collateral circulation by anastomosing branches was understood. The facility which is thus afforded to the re-establishment of the circulation, after a ligature has been applied upon an arterial trunk above the seat of injury or disease, is, in some instances, the cause of the operation failing in accomplishing the proposed object: an aneurismal sac will thus be supplied with blood, or bleeding (in a case of wound) will come on from the lower extremity of the vessel. In consequence of the freedom of inosculation increasing in proportion to the remoteness of arteries from the heart, we find that hemorrhage is comparatively rare in the large trunks,—such as the subclavian and axillary,—but almost certain in their more distant subdivisions, under the circumstances referred to.

The prominence of the vein (median basilic) which crosses the brachial artery at the bend of the elbow, is a great temptation to an inexperienced or careless operator. I do not hesitate, therefore, to repeat, that a vein should *never* be opened where it is crossing an artery; if another suitable vein cannot be discovered in this situation, then one must be sought on the forearm or even on the hand.

There are several ways in which the brachial artery may be wounded by the lancet: thus, the artery may be punctured through the vein where these vessels are not in actual contact, and then the blood is extravasated. Or again, the two vessels may be made to communicate by a wound, and then the vein itself is dilated by the access of arterial blood into it; this form has been denominated *varicose aneurism by transfusion.* There is an essential difference between this and all the other consequences of a similar injury.

Varicose aneurism may occur wherever a vein and an artery are in immediate contact, but especially at the bend of the elbow, the groin, the ham, or the inner part of the thigh. These tumours have also been observed at the lower part of the neck, in the axilla, or at the anterior and inner part of the clavicle. Independently of the anatomical relation first noticed, a puncture is necessary to the production of the disease. This kind of aneurism exhibits itself in the form of a small and soft circumscribed tumour, which disappears under pressure; it pulsates synchronously with the heart, and on applying the ear to it, a peculiar thrill is audible. Its development is slow, and it is less serious in its nature than false consecutive aneurisms; but it does not disappear spontaneously as they do. The constant mingling of the two currents of blood in both the vessels involved in the disease produces a remarkable change in their structure and characters. The artery, receiving venous blood, becomes dilated, thinned and tortuous; losing, in short, its own peculiar characteristics, and assuming those of a dilated vein, *below* the seat of injury. The vein, circulating arterial blood, changes also, becoming thicker and firmer around the wound, but especially so above the diseased part.

Theory led to the adoption of Hunter's method of operating in these cases, but experience has proved its inefficiency. There is, indeed, a peculiarity attached to varicose aneurism, which makes this operation less applicable to them than to other forms of aneurism. When a ligature has been applied to the upper end of an artery in a case of common aneurism, it acts as an obstacle to the retrograde as well as the direct course of the blood through the sac, which, together with a portion of the artery beyond it, becomes converted into a cul-de-sac, in which the blood coagulates. This is not so in varicose aneurism, where the communication between the vein and artery readily allows of the circulation being carried on through collateral channels, which would be otherwise unavailable. One mode of meeting this difficulty is to tie the vein above and below the disease; but this course is open to objections, especially the risk of phlebitis, which is more likely to ensue in a diseased than in a healthy vein. Moreover, the varicose aneurism may be complicated with false consecutive aneurism.

Surgery is rich in the variety of operations, but poor in the facts, which are requisite to establish the preference to be given to one mode of proceeding over another. The father of medicine has justly observed, that "life is short and art is long; whilst opportunities are fleeting, experiments perilous, and judgment difficult." To this may be added, that a multitude of facts are either neglected, abridged, or so carelessly collected, if preserved at all, as to be almost valueless.

I am not aware of any surgical work which contains a complete series of facts on which to found an exact parallel of the advantages and disadvantages attending various modes of operating, applicable to the treatment of different forms of disease. Indeed, but few practitioners are able to give a faithful and impartial account of what they have done; and yet such facts are the only suitable foundation on which to build positive conclusions respecting the relative advantages of different modes of operating. These general remarks are specially applicable to the subject of aneurism. I am not aware, for instance, that any surgeon has proved by cases, whether it is more desirable, in varicose aneurism, to tie the artery both above and below the disease, or merely above it. But experiment has proved the insufficiency of the latter method; and that the collateral circulation, which is so essential an element in the cure of ordinary aneurism, is the cause of the evil being perpetuated in this particular form of the disease: for, though for a time it may appear cured, sooner or later it will reappear; and the best method of averting this result, is to tie the artery both above and below. The cases published in Sabatier's 'Operative Medicine,'[1] and by M. Breschet,[2] place this fact beyond doubt.

CASE I.—*False aneurism of the brachial artery.*—J. L. Potier, aged 22, was admitted into the Hôtel-Dieu, in June 1819. A week previously he had been bled in the median-basilic vein, and the artery was wounded; scarlet blood was thrown out in jets, and difficult to stop. The nature of the accident being perceived, compression was tried, and the whole arm became swollen and painful, and subsequently inflamed; the aneurismal tumour increased in size, and in the force and extent of its pulsations.

At the time of his admission these symptoms continued, and a good deal of blood was extravasated around the puncture; and a remarkable whizzing sound was occasioned by the passage of the blood from the artery to the vein. The limb preserved its natural heat, and the radial artery could be felt still pulsating.

In discussing the proper course to be pursued in this case, the alternative of adopting compression seemed out of the question, as it had already been tried ineffectually, and moreover, the inflamed condition of the arm forbade it. And it appeared to me that there would be great probability of failure, if I tied the artery, in its inflamed state, close to the wound: moreover, the condition of the surrounding textures would materially increase this risk, and be in itself a dangerous proceeding. I therefore concluded that the best mode of proceeding was to tie the artery high up in the arm. This was accordingly done in the usual way, and without difficulty or accident of any sort to the accompanying veins and nerves.

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[1] Vol. iii.

[2] Mémoire sur les Anévrismes.

On the first day the patient complained of violent palpitation, to which he had been subject. The heat and sensibility of the limb were natural; the tumour was pulseless, but there was still some thrill in the vein, though the radial artery could not be felt beating at the wrist. Twenty leeches were applied to the arm.

On the third day the local inflammation was subsiding; but the pulse could now be distinguished at the wrist, and already the tumour began to beat again.

On the fourth day all inflammation at the bend of the elbow had subsided. The thrill was no longer discernible in the vein, which had no doubt been obliterated by inflammation.

On the eighth day pulsation in the tumour was as strong as ever; a small clot plugged the wound (made by the lancet) and prevented hemorrhage.

On the ninth day, when the dressing was removed, this clot was detached, and a stream of arterial blood followed, which was, however, arrested by pressure on the collateral arteries. It was evident now that the lower extremity of the artery must be tied; and I at once made an incision over the wound, emptied the sac of its dark, coagulated blood, and sought for the lower extremity of the vessel. A double ligature was then carried beneath the point from whence the jet of blood was observed to proceed, and the artery was thus secured both above and below the wound in it. At this time an assistant was compressing the axillary artery against the head of the humerus, and thus stretched this vessel so as to drag upwards that point of the brachial which had been originally tied. The consequence was that it gave way at the seat of ligature, and a gush of blood followed. The subclavian was then compressed; after which, on removing the pressure, there was no further bleeding. The artery could not be found, nor could it be made to bleed again, even though wine was administered to stimulate the circulation.

The patient was carefully watched, but there was no more hemorrhage. On the 18th day the two fresh ligatures came away; and on the thirty-second he quitted the hospital cured. The radial artery could then be felt at the wrist.

Nine months afterwards this patient was seen, and his limb continued quite sound. On examining the arm, and tracing the course of the axillary artery downwards, the brachial could be felt pulsating to within a short distance of the upper cicatrix. From this point the pulsations could be traced towards the back part of the inner condyle of the humerus, where the vessel broke up into numerous branches. This was evidently the inferior profunda branch, which had taken the place, and almost acquired the size, of the parent trunk; the superior profunda could also be felt, but less distinctly on account of its greater depth. The radial artery could be felt pulsating, but the ulnar could not be distinguished.

The following case, though in some respects a parallel one, offers some interesting points of contrast as regards the treatment and its results.

CASE II.—*Varicose aneurism of the brachial artery.*—Louis F—, aged 22, a merchant, of plethoric habit, came to Paris, in 1814, to consult me. Two years previously he wounded his arm with a bradawl, which implicated both the brachial artery and vein. Blood flowing freely, pressure was employed; the wound healed, and no further apprehension was entertained. After the lapse of six weeks the patient perceived an extraordinary pulsation, and a peculiar thrill near the cicatrix. The absence of any other alarming symptoms, and the advice of his medical attendant to pay no attention to it, but to use his arm as usual, induced him to take no further step until he came to Paris.

At this time, a soft tumour of considerable size was perceptible beneath the cicatrix; it pulsated in the centre, and the thrill by which its throbbing was accompanied extended to the neighbouring veins; these, and indeed all the veins of the arm were dilated, especially when the limb was pendent. When, on the contrary, the arm was raised, the tumour became softer, and the whizzing sound was unheard when the artery was compressed above the tumour; nor did it augment when that vessel was subjected to compression below. The patient used his arm habitually, and experienced no pain, but only a constant numbness.

I suggested that the brachial artery should be tied above the aneurismal sac, and this was acceded to, and accordingly performed as in the last case. Soon after the operation the limb became cold and insensible: and, in spite of every effort, the fingers did not recover their sensibility nor warmth, but soon became contracted, and were with difficulty straightened. On the fourth day there was slight hemorrhage, which ceased on removing the dressings. On the thirteenth day the ligature came away; and shortly afterwards the peculiar sound alluded to, and the pulsation in the tumour, which had entirely ceased, again became apparent, and daily increased. Compression was resorted to, but in vain; in fact, it was evident that the disease had resumed its former condition, now that the collateral circulation was estâblished. The arm as well as the fingers became permanently flexed;—a condition which could not be attributed to a nerve being injured, as nothing but the artery was included in the ligature. There was no doubt about the propriety of tying the artery below the tumour, but to this step the patient would not submit. He applied for other advice, and the sequel was that his arm was amputated.

On examining the limb, a varicose aneurism was found to exist; there was considerable dilatation of all the veins, and thickening of their coats; the lower extremity of the artery was also dilated and tortuous, and its structure so altered as to resemble a varicose vein rather than an artery.

This case teaches us that a ligature placed upon the artery is less likely to be attended with success where the existence of the disease is of long standing, and that the course adopted is not applicable in this and similar instances. It also demonstrates the fact that the artery does dilate, and points to the inference that such dilatation is attributable to the circulation of venous blood in the artery below the injury.

Varicose aneurisms are not confined to the bend of the elbow, though it is their most common seat. They may occur, in fact, at any part where an artery and vein, which are in close relation to each other, are implicated in a common wound. The following is an example.

CASE III.—*Varicose aneurism of the right common carotid artery and external jugular vein, occasioned by a sabre-wound.*—M. D—, aged 43, was wounded in a duel, twenty years ago, by a thrust from a sabre a little above the right clavicle, near to its acromial extremity. He immediately lost a considerable quantity of fluid blood, which flowed in jets. M. D— arrested the bleeding by securing some folded handkerchiefs on the wound; and walked a considerable distance to a hospital. The edges of the wound were brought together, and the patient was kept in bed and on low diet for five days, when he left the hospital, the wound being healed. On returning home, he and his family were surprised to notice violent pulsation, accompanied by a peculiar noise about an inch above the cicatrix; but, as he felt no inconvenience, he paid no further attention to it, beyond mentioning it to his friends as a matter of curiosity.

On examining M. D—'s neck, the old scar was seen; and above it, over a space about two inches square, pulsations, synchronous with the heart's action, were perceptible to the sight and touch, accompanied by a frequent whizzing and rushing sound. When listened to, it was like a spinning wheel in motion; the neighbouring skin was natural in appearance, and the veins were but little dilated; the slightest pressure occasioned giddiness and a peculiar kind of confusion, especially affecting the right side of the head and the right eye. On increasing or continuing the pressure, the symptoms became more distressing, and the patient felt as if he should faint if it were persisted in. The pulsation was arrested only by pressure an inch and a half above the cicatrix; below, the same effect was not produced. The force of the pulsation was uniform, and not influenced even by violent mental emotion. He has had palpitation of the heart frequently, but lasting only for a short time. During the night he heard a constant movement in the right side of the neck, which he compared to the prolonged action of a spinning-wheel; and by it his head was raised occasionally from the pillow. The patient's health was good, and he was able to pursue his daily occupation as a tinman.

There can be no doubt that M. D— was the subject of a varicose aneurism; and, judging from the seat of the wound, that the right external jugular vein communicated with the common carotid near its origin. This patient was seen and examined by the Academy in 1824.

In the cases already cited, we have seen that the puncture of a lancet or any sharp-pointed instrument, in traversing a vein and artery in juxtaposition, produces a varicose aneurism; I now wish to direct attention specially to false consecutive aneurism of the brachial artery, occasioned by venesection badly performed.

Case IV.—*False consecutive aneurism of the brachial artery, following venesection.*—A healthy man, about 40 years of age, was bled in the arm by a midwife, about two months before he came under my observation. The artery was pierced through the vein, and the scarlet blood was thrown out forcibly in jets. Now, this is a characteristic sign of the injury in question; viz.—that the blood is ejected to a considerable distance, not in a continuous stream as from a vein, but in jets, at any rate just at first. In the case in question, it would appear that the midwife knew what mischief she had done, for she applied a compress, and bandaged the arm tightly over it. The patient experienced numbness and swelling of the fore-arm and hand, caused probably by the bandage; and these symptoms were attended by considerable ecchymosis, but there was no tumour at this time. After three weeks had elapsed, a circumscribed pulsating swelling made its appearance, which, in four weeks' time, attained the size of a pigeon's egg. I apprehend the history of this case to be, that the pressure in the first stage closed the wound in the artery, which was afterwards re-opened by the use of the arm; and that then the gradual escape of the blood into the cellular tissue formed the tumour which subsequently became apparent.

In this and similar instances, dependence must not be placed exclusively on the pulsating character of the tumour, as it is now well known that a swelling over an artery may have the pulsation of the vessel communicated to it, although the parts are only contiguous to each other. In cases like the present it is observed that, after a time, the skin rises to a point and becomes very thin, threatening to burst and give rise to serious bleeding, which may be fatal. It is, therefore, essential to take some decided step; and, as the urgency of the condition and the risk of gangrene forbid pressure, the ligature is the only resource. Under such circumstances the question which naturally presents itself is, whether the artery should be tied on both sides of the seat of disease, or only above it. The former proceeding, although apparently the more sure, is obnoxious to many serious objections. The proceeding would be accomplished in the following way: after stopping the flow of blood through the artery, the skin is divided over the tumour, the sac laid open, and the opening in the vessel searched for. This, and the application of the ligatures, is by no means an easy matter, especially on account of the venous bleeding; but, supposing it to be effected, it is very probable that phlegmonous inflammation may follow. A single ligature above the seat of disease may, on the contrary, be applied without difficulty, and with much less risk of unpleasant after-consequences. Yet, it must be admitted that this operation sometimes fails, in consequence of the inosculating branches carrying on the circulation collaterally. This is the case in aneurism of the common carotid artery and its divisions: a ligature placed below the tumour suspends for a time its pulsation, but this speedily reappears; and the same may occur in aneurism at the bend of the elbow.

Sometimes, however, the blood flows in such a way as to give rise to the impression that the artery has been opened through a vein, whereas, the super-position of the latter on the former is the cause of the deception. I was called, some years ago, in great haste by a celebrated physician, who had just bled a patient; and seeing the blood issue by jets, concluded that he had wounded the artery. I immediately detected the cause of the mistake; but he persisted in his idea that he had pricked the artery, and would never relinquish the opinion.

The above case puts me in mind of another which came under my observation in 1816. A young woman, 18 years of age, was admitted into the Hôtel-Dieu, with occasional hæmoptysis. Several attempts had been made to bleed her in the basilic and cephalic veins, but the quantity of blood thus obtained was insufficient. On one occasion, the median-basilic was selected. The dresser felt the vein rolling beneath his finger, but could not distinctly see it. By a sudden movement of the patient, the opening in the vein was made larger and deeper than was intended; and scarlet blood was thrown out in jets, producing a scalding sensation on the arm as it flowed. The bleeding-bandage being removed without controlling the hemorrhage, another pupil compressed the brachial artery in the middle of the arm, and the blood ceased to flow. Being satisfied that the brachial artery was punctured, a light compress was applied over the wound, and the current of blood through the brachial arrested by pressure above; and I was sent for. In an hour and a half afterwards I saw the patient; and on removing both compresses, to the surprise of the pupils, nothing flowed. The arm was placed on a pillow, the wound made by the lancet was left exposed, and the patient watched. There was no further bleeding, and the wound healed in four days. The patient remained for two months afterwards in the hospital, without the appearance of any tumour at the bend of the elbow; and when again seen, nearly twelve months afterwards, the arm continued in a perfectly healthy and natural condition.

In this case, was the artery wounded or not? At the time there seemed to be every indication of this injury; and yet, non-recurrence of the hemorrhage disposes me to the belief, that in this, as in the preceding instance, the operator must have been deceived. At any rate, if such lesion was sustained by the artery, the wound must have healed spontaneously; and the possibility of this result may be fairly questioned.

After this digression I return to the case under consideration. I determined to treat the disease by tying the brachial artery above the aneurismal sac. The patient being placed in the recumbent posture, and the arm semi-flexed, an incision, about three inches long, was made towards its lower part; the sheath of the artery, being thus exposed, was nipped up with a pair of forceps, and opened to a small extent with a bistoury;

the ligature was easily passed beneath the vessel. As soon as it was ascertained that pressure upon the artery arrested pulsation, the ligature was tightened,—a precaution particularly important in this situation, on account of the existence, occasionally, of a high division of the brachial. The wound was then simply dressed.

I was under some apprehension as to the result of this case, for there might be a communication established between the upper and lower extremity of the artery; and again, the vein was large and tender; and though there had been no audible evidence of a communication between the vein and the artery, there might, nevertheless, be a small opening which had not been detected. The patient, however, recovered, without the occurrence of an untoward symptom.

Case V.—*False consecutive aneurism of the brachial artery, following venesection.*—A hawker, about 32 years of age, was bled for severe headache, and the brachial artery was punctured through the vein. The surgeon detected the nature of the injury he had inflicted by the colour of the blood and the mode in which it issued. He allowed it to flow till the patient fainted, and then applied pressure so as to prevent a recurrence of the bleeding, and directed a continuance of the same treatment, without, however, informing the patient of the nature of the accident. The wound healed; the patient thought there was no more to fear, and left off the compress: a tumour made its appearance at the bend of the elbow, and increased in size day by day.

When this man was admitted into the Hôtel-Dieu, in December, 1828, the tumour had attained the size of a fist, rounded, even, fluctuating, and pulsating synchronously with the heart. This pulsation was distinct when the arm was flexed, but ceased entirely when it was fully extended. When the artery was compressed above the tumour, no movement in the latter was perceptible; but when pressure was applied below, pulsation became stronger and more apparent. From these signs it was concluded that the opening in the artery was small; that the aperture in the artery and that communicating with the aneurismal sac were not parallel; that the latter received blood by only one channel; and that the greater part of the blood contained in the sac was coagulated. It was, therefore, argued that compression, accurately applied, might suffice to effect a cure. This plan was accordingly tried, and ice was applied at the same time; but as no good result followed, the patient's wish to be operated on was acquiesced in, and the artery was tied about two inches above the tumour. Some delay was occasioned by the patient becoming faint just when the vessel was exposed, and in consequence of the difficulty that was occasioned in distinguishing the artery from the nerve. The wound was simply dressed, and the tumour covered with ice.

In the evening the limb had resumed its normal temperature, and a quiet night was passed. On the following day the radial artery could be felt pulsating, but only for a season; the ice was continued.

On the fifth day, when the wound was dressed, erysipelas of the part was apparent; and this continued to extend itself upwards and downwards, but abated after the discontinuance of the ice and the employment of blisters.

On the eighth day the sac gave way, and blood mixed with pus was discharged. This continued; and, on the tenth day, the ligature came away without hemorrhage.

On the fifteenth day, the different openings communicating with the sac were laid into one, and the sac was emptied of its contents; in the course of the day there was some bleeding, which was arrested by the application of a compress. After this, suppuration was fairly established, and the patient made a speedy and safe recovery.

In reviewing the foregoing case, the question naturally suggests itself, whether an operation was really essential for the cure of the disease. Might not forced extension, aided by compression and ice, have sufficed to obliterate the aneurism? This position of the arm, if continued, would have been very painful to bear, and might have produced anchylosis; and with respect to compression and ice, these are remedies by no means free from danger, if persisted in for a long time, which would have been necessary. I adopted the operation which was performed, after ascertaining that the tumour presented none of the signs characteristic of varicose aneurism. The rapid return of the circulation led me to fear that the operation had failed of its object; and to counteract the tendency to the free admission of blood into the sac, the continuous application of ice was resorted to.

As regards the re-establishment of the circulation by anastomosing vessels, I may remark that the blood arrives below the ligature some time before the arterial trunk shows evidence of it by pulsation, the distension of the vessel and its elasticity being the first indication of the phenomenon in question. At a later period a slight tremor is perceived, probably indicative of the renewed influence of the heart at the part affected. This sign is regarded as a token of the success of the operation: yet it may disappear after an interval, varying from a fortnight to three months after the operation; and gangrene has then supervened. But I may observe that I have never seen gangrene follow ligature of the brachial artery where the nerve has remained intact. If it should be found that blood again enters the sac freely, then the only alternative is to tie both ends of the artery. In the case first narrated, the ligature came away on the tenth day; whereas, in another case, which occurred about this time in my practice, and in which the femoral artery was tied, the ligature did not separate till the twenty-fifth day. How is this difference to be accounted for? it is probably due to the size of the artery in each instance, to the degree of pressure exercised by the ligature, and to the quantity of areolar tissue included in its noose.

Case VI.—*False aneurism of the brachial artery treated with ligature and cured.*—A young man, aged 22, was bled by a surgeon in the median basilic vein, which the lancet penetrated through, and wounded the artery: fluid blood followed the puncture, and was thrown out to a great distance. The nature of the accident being perceived, compression was methodically employed at the seat of injury. At first the hemorrhage was thus commanded; but, as it afterwards recurred at intervals, the patient came to the Hôtel-Dieu, and was admitted in June, 1829.

Nine days after the accident there was a tumour at the bend of the elbow, as large as a walnut, soft, fluctuating, and expanding and contracting alternately, synchronously with the heart's action: pulsation was arrested by pressure on the artery higher up. The wound in the vein had healed, and there was no evidence of a communication existing between this vessel and the artery. I determined on tying the brachial artery, and this operation was performed on the day following the patient's admission. The subcutaneous cellular tissue was found to be infiltrated with blood, and the fibro-cellular sheath, enclosing the artery and median nerve, was dense and friable: a large vein crossing the incision was divided. When the ligature was passed, I found that the nerve was also included in it; and this necessitated a further dissection and re-introduction of the needle. When the ligature was tightened, pulsation in the tumour, and throughout the limb below it, ceased. Not a single untoward symptom occurred. The fore-arm retained its natural temperature and colour. On the third day pulsation in the radial and ulnar was again felt, but the tumour remained pulseless. On the tenth day the ligature came away; and on the nineteenth the patient was discharged cured.

This case proves that, though the operation of tying the brachial is apparently so easy, care is required to avoid including the nerve in the noose of the ligature: and it serves as an illustration of the axiom, that rapidity in operating is a poor compensation for the risk which it often entails.

But the successful issue attending the foregoing case is by no means uniform; and in many instances it is essential to tie the artery both above and below the seat of disease, to secure the patient from all risk of secondary hemorrhage. The following case, which occurred under my notice, will serve as an illustration of the above remark.

Case VII.—*False aneurism of the brachial artery; ligature and repeated secondary hemorrhage.*—J. Herbert, aged 17, a saddler, in robust health, was wounded in the middle of the left arm with an awl, whilst playing with his companions. Florid blood immediately spirted from the wound with great force, and was imperfectly stopped at the time. After the lapse of some hours he was brought to the Hôtel-Dieu.

It was immediately determined to tie the brachial artery, as the nature of the hemorrhage admitted of no doubt that that vessel was wounded. An incision was accordingly made in the course of the artery, through the infiltrated cellular tissue, and the bulging biceps muscle was partially divided, as it impeded the operator. Two ligatures were then applied, one above, and the other below, the supposed seat of injury, a number of other parts being included in the nooses. The bleeding was, however, arrested; and a quantity of lint was stuffed into the wound, and the arm tightly bandaged.

For a week all went on satisfactorily; and then, for the first time, the whole dressing was removed, and a small quantity of blood escaped. In the evening, violent bleeding occurred. Three ligatures were passed ineffectually beneath the brachial artery, but a fourth arrested the hemorrhage. On the ninth day, the patient bled again, and the artery was again tied; and a repetition of this operation was required twice more before the fourteenth day.

On the fifteenth day hemorrhage again recurred; and the patient being by this time much prostrated, amputation was determined on, and performed very near to the shoulder-joint.

On the following day, there was bleeding again; and then for the first time the patient was placed under my care. I exposed the artery, and tied it higher up. On the seventeenth day the bleeding once more recurred; and the patient was by this time in a state of extreme exhaustion and delirious. The only remaining hope was to apply a ligature on the axillary artery; and this was accomplished, after a long and tedious dissection, by dividing the pectoralis major about two inches from its insertion, and likewise a part of the lower border of the pectoralis minor. The blood lost during the operation was like red, viscid serosity, but of a bright crimson hue. The patient survived the operation only a quarter of an hour. The only circumstance worth recording in the examination of the body is, that the arteries appeared very thin, and capable of but feeble resistance. This may account for the persistance of the hemorrhage after such repeated application of the ligature.

Case VIII.—*Aneurism of the brachial artery following a punctured wound.*—A wine-merchant, aged 45, was bled for hemoptysis, and a wound of the artery through the vein was manifested by the usual consequences. In spite of firm pressure a pulsating tumour formed at the bend of the elbow, and attained, in the course of a month, an enormous size. I tied the artery above the sac, and immediately all pulsation ceased in the latter. In the night following the operation the patient had an attack of hemoptysis, for which he was bled twice. I may remark that it is not uncommon to witness symptoms of plethora, and even hemorrhage, follow the application of a ligature on a large arterial trunk: sometimes they assume the form of palpitation, giddiness, or epistaxis, hemoptysis, &c.; and bleeding is the proper remedy. In this case the radial artery soon began to pulsate; but the tumour remained pulseless, which I attribute to the presence of a clot between the seat of ligature and the sac. No untoward symptom occurred subsequently in this case, and the cure was complete in a month.

I may conclude the present subject by remarking, that the operation of tying an arterial trunk above the seat of a wound is almost always successful, when the injury is recent, and the edges of the wound are fresh, and, therefore, disposed to unite; but that there is much less chance of success when the lesion is of long standing, and the edges of the wound are consequently indisposed to adhesion. In the former class of cases, a single ligature applied above the injury is sufficient; but in the latter, it is always requisite to tie the artery both above and below the wound. The only exception to these rules is, when the injury is inflicted on an artery near to the extremity of a limb, in which case it is indispensable to employ the double ligature, on account of the multiplied communications by anastomosing branches. This important theory will explain facts which have been hitherto difficult to understand.

SECTION V.

ON VARICES OF THE LOWER EXTREMITIES, AND VARICOCELE; THEIR CAUSES AND TREATMENT.

A great variety of means has been adopted to effect a radical cure of varicose veins, but almost all have been in turn abandoned. Ligature and compression are the measures most usually resorted to. Uniform compression is unquestionably one of the best remedies; and, if it has not the advantage of accomplishing a radical cure, it affords marked relief, and is free from danger.

It must not, however, be supposed that compression, simple as it may appear, is to be recommended without certain precautions, especially when the veins are very large, and the disease is of long standing; for there is a risk, in such case, of exposing the patient to the effects of congestion in the abdominal viscera. Indeed, I have more than once witnessed giddiness, oppression, and other symptoms of venous congestion in the brain, and also in the chest, which have endangered the patient's life. To obviate such effects, I have been in the habit of taking blood from the arm, once or more often, to relieve the venous system, before enforcing the horizontal posture or employing compression.

In investigating the causes to which varices have been ascribed, one cannot help being struck with the accuracy exhibited by authors in copying one another, from the time of Hippocrates downwards. MM. Breschet and Briquet have, indeed, done more for this branch of practical surgery; but I will now give the results of my own experience on the subject.

There are efficient physical causes for this diseased condition of the veins affecting the lower extremities. The erect posture is one; and when we add to this any long continued vibratory or shaking motion, we have two causes which, united, constitute a serious impediment to the return of blood from the lower parts of the body. Servants whose business it is to stand behind carriages are subjected to the combined influence alluded to, and are frequently the subjects of varicose veins of the legs. Coachmen, also, are unfavorably circumstanced; for though they are sitting, still the lower extremities are dependent; and moreover, the free use they make of their arms operates negatively, in rendering them more obnoxious to the effects of a retarded circulation in the lower limbs.

The greater frequency of varicose veins and of varicocele on the left side, is probably due to the mechanical interruption to the flow of blood, caused by the position of the sigmoid flexure of the colon when distended.

There are many communications between the trunks and branches of veins; though these are less numerous than many have supposed. And these communications constitute obstacles to the cure of varices by obliteration of the diseased trunk. But it must be borne in mind that, for the re-establishment of a collateral circulation under these circumstances, as where the saphena, for instance, has been tied at the knee, there must be an anastomotic branch without a valve communicating with the principal trunk, or a direct anastomosis between the superficial and deep veins.

I remarked that many remedies have been proposed for the cure of varicose veins. Ligature of the trunk in which the dilated branches terminate, with the view of procuring coagulation of the blood in the latter, and consequent obliteration of their canals, is far from attaining the desired end; for, experience proves that such obliteration does not extend beyond the immediate neighbourhood of the ligature. For the cure of the wound made by the operation, the patient is obliged to keep quiet and in the horizontal posture; and the benefit derived is to be ascribed rather to these circumstances than to the operation itself. The proof that such is the case is afforded by the fact that, after the patient has for a time resumed his ordinary avocations, the varicosity is as apparent as before the operation.

The risk of phlebitis following this treatment should not be lost sight of. It has frequently proved fatal; and, considering the uncertainty of the benefit to be derived, one cannot but feel convinced that the danger is disproportioned to the problematical advantage.

There is, however, a modification of the operation referred to, which is more certain in its result, and it consists in the application of two ligatures at distant points, so as to produce coagulation of the blood contained in the intervening diseased veins. Thus, for instance, for the cure of varices of the leg, the saphena should be tied below or on a level with the malleolus, and also below or on a level with the condyle, or even higher if necessary.

CASE I.—*Varices of the leg, with ulcer. Ligature of the saphena vein.*—A man, 31 years of age, of good constitution, was admitted into the Hôtel-Dieu, in 1829, with varicose veins of the legs. When seventeen years old, the veins of the lower extremities assumed a varicose condition, for which cold bathing in running water was ordered, but with no benefit. Six years previously to his admission, the tension of the veins had increased to such an extent, that many burst spontaneously, and he lost much blood. The right internal saphena vein was that which was principally affected, being largely dilated at the groin and throughout the leg, and there was a varicose ulcer on the inner side of the latter. I tied the saphena on a level with the malleolus and above the knee, and was gratified by a result which exceeded my expectation; for, not only were the ulcer and varicosity in the leg cured, but the tumour in the groin finally disappeared altogether.

When this man was examined five years afterwards, the veins of the limb which had been the seat of operation were in a normal condition, but the disease had been transferred to the opposite extremity, and a similar tumour existed in the groin, just where the saphena dips in through the fascia lata. I may here remark on the diversity of tumours at this spot, and the importance of forming an accurate diagnosis by attention to the distinguishing characteristics in each case. In the present instance, the swelling in question had many of the characters of a crural hernia, occupying a similar position, being soft and rounded, and disappearing under pressure. But, on relaxing the abdominal muscles, and pressing upwards the viscera, so as to prevent the extrusion of any portion of intestine, the tumour went and returned, under pressure and its removal, as before.

I tied this vein, as I tied the other, and the following were the steps of the operation. Having drawn the integument to one side, I made an incision parallel to the vein, and about four inches above the condyle of the femur. On allowing the skin to regain its natural position, this incision corresponded to the vein: a ligature was then applied, and tightened without pain. A similar operation was performed about an inch above the outer malleolus. The wounds were immediately closed. Nothing particular occurred in the progress of the case, and the patient left the hospital quite well.

The rationale of this treatment appears to be this. The blood contained between the two ligatures coagulates, and the clots harden so as to give great firmness to the vessels; when the coagulated fibrin in the veins is absorbed, these vessels resume a healthy condition. Though this double operation is decidedly preferable to the other, yet there is risk of phlebitis; and on that account I prefer, in such cases, to employ compression by laced stockings; prescribing, as a preliminary step, the horizontal posture for some days, and taking away some blood from the arm.

The success attending the preceding case is by no means uniform, as the following instances attest; and I must candidly admit that frequent failures, and the attendant risks, have induced me to relinquish this plan of treatment.

Case II.—*Varicose veins of the left leg, treated by ligature.*—J. Quesnel, aged 54, a servant, was admitted into the Hôtel-Dieu, in 1823, having been the subject of varicose veins and ulcer of the left leg for twenty-eight years. He was operated on in the same way as the patient in the last case, and the wounds were closed with strips of adhesive plaster. In the course of the day the patient experienced uneasiness and numbness of the extremity; and on the following day he had headache and a flushed face. He was bled, and on the fourth day was better. The veins also were diminished in size, and it appeared as if the blood in them had coagulated. At the end of a fortnight, both the ligatures had separated, and in a few days all the wounds were healed. Yet, when this man got up, it was evident that the operation had been ineffectual in curing the varices, which were as large as ever; and he was forced to have recourse to the artificial support of a laced stocking.

CASE III.—*Varicose ulcer of the left leg treated by ligature.*—P. Leproux, formerly a sailor, was admitted into the Hôtel-Dieu, in 1823, with varicose ulcers of the left leg, from which he had suffered for eight years. Above and around the ulcers the divisions of the saphena vein were largely dilated. In this instance I thought that a ligature applied on the trunk of the saphena, in the middle of the thigh, would effect a cure. Accordingly, after preparing the patient by bleeding and cooling medicine, I performed this operation. In the course of the same day he had rigors and severe headache, for which he was largely bled. On the following day he was better, and at the end of a week the ulcers were nearly healed, and the varicosity of the veins was diminished. On the twelfth day the ligature came away, and the wound soon afterwards healed. But in this patient, likewise, the varices resumed their former size as soon as he got up and moved about.

Associated with the subject now under consideration is a common variety, known by the name of *Varicocele.* This disease consists in a varicose condition of the veins of the spermatic cord; and is met with exclusively, in its commencement, between the ages of twenty and thirty. The anatomical conditions which favour the production of this complaint are, the vertical position of the spermatic veins, their length, the absence of valves in them, the alternations of vacuity and repletion to which they are so frequently subjected, and, above all, the multitude of veins which, under the title of *corpus pampiniforme,* give origin to the veins of the testicle. Varicocele most usually occurs on the left side, as Morgagni correctly pointed out,—a circumstance probably due in part to the fact that the spermatic vein of this side terminates, at a right angle, in the corresponding emulgent vein: pressure exercised by accumulated fæces in the left iliac portion of the colon is, doubtless, also a reason why the disease is more frequent on the left than on the right side.

There does not seem to be any special association between varicocele and varicose veins of the lower extremity; indeed their co-existence seems to be rather rare than otherwise, as remarked by M. Landoury in a work on this subject. Moreover, varicocele is comparatively rare in old people, except as a legacy from youth: nine tenths, at least, of those who are the subjects of this complaint are young persons; and in many M. Breschet believed it was traceable to self-pollution.

It would appear to be, in some instances, an hereditary affection; thus, M. Breschet mentions an instance in which a father and several sons were all similarly affected with varicocele. It is of much more frequent existence than is generally supposed; for the examining surgeons of conscripts declare that a seventh, or even a fifth, of all who appear before them have this complaint.

The symptoms by which this disease is characterised are, a sense of weight in the scrotum and cord, and a lax condition of the cellular tissue of these parts. Soon afterwards the testicle with its coverings, on the affected side, hang lower down than in health; the cord becomes bulky and nodulous, especially after much walking or standing for any length of time, and this particularly in hot weather and in warm climates.

The inconvenience gradually increases with the augmented volume of the affected parts, and the veins become more distinct beneath the skin; they assume a dilated and plexiform arrangement; but this varicose condition may specially pertain to the cutaneous veins as they leave the scrotum, and on the left side more than the right; or these vessels may retain their normal development, whilst those of the sphermatic cord and epididymis, even up to the internal abdominal ring, become distended, and impart the characteristic of extraordinary increase in volume to the cord. It should be remarked that the horizontal posture, and the local application of cold, have the effect of dispersing the swelling for the time their influence is in operation.

In the course of time the sense of weight extends upwards along the cord into the abdomen, and even to the loins and back. The upright posture and walking for any distance occasion much distress. The patient mechanically carries the hand to the scrotum to afford the testicle some support. At a later period, the slightest pressure occasions suffering; and not infrequently the pain is of a neuralgic character, and extends upwards into the abdomen in the direction of the cœliac plexus.

In one instance which came under the notice of M. Breschet, the neuralgic pain, which was excited by the slightest movement, was so intense, that the patient begged that he might be castrated to obtain relief. In other cases the same surgeon has remarked the development of the disease, without the coexistence of any suffering beyond the inconvenience consequent on the weight of the gorged vessels.

When the disease has attained a certain stage, the varicosity is most marked in the neighbourhood of the epididymis; and then not only the origin of the excretory duct is enveloped by the tortuous and dilated veins, but the body of the gland itself. A superficial examination of the testicle at this period would give an impression that it was increased in size; but this is a mistake. A more careful investigation proves that the testicle is in reality diminished in volume; and in some instances this atrophied condition is very decided. This point should be carefully noted and pointed out to the patient, otherwise the surgeon may have the credit of having sacrificed the organ by the treatment which he adopts for the cure of the varicocele. Where this is the case, M. Breschet has observed that the varicosity commenced at the epididymis, and that this part was diseased consequent on one or more attacks of gonorrhœa. But, as already remarked, there is no constant correspondence between the side of the varicocele and the attendant suffering. The pain may be extreme, though the swelling is but moderate; whereas, in other cases, an excessive dilatation of the vessels may be attended by little or no actual pain.

The diagnosis of this complaint is so simple and easy, that with a little attention and habit of observation it is difficult to mistake it; and yet varicocele has been taken for hernia, abscess, hydrocele, &c. Varicocele follows the direction of the cord, as high as the inguinal canal; but sometimes it seems to spring from the epididymis, and rises towards the ring; whereas, at others, it appears to descend from the latter point towards the testicle. Slow in its progress, the descending form of varicocele is more surely accompanied by pain than the ascending. Exposure of the scrotum to cold air, the application of cold, or the horizontal position, diminish or cause the entire disappearance of the swelling on the testicle and cord; but warm applications, the upright posture and walking, reproduce the distension of the veins. The degree of sensibility under pressure varies very much in different cases.

One symptomatic circumstance connected with the history of varicocele, is the influence it exercises on the moral condition of the patients affected with it. It is well known that diseases generally of the genito-urinary system produce a very depressing effect; but this is especially the case in the complaint under consideration. Melancholy, [illegible] life, tendency to suicide, and even insanity are common attendants on this disease; virile power is diminished, and abstinence from sexual intercourse is the consequence. These effects are not constant, but M. Breschet has observed them, more or less, in all instances; and these results account for the despondency and shyness of patients. Many instances have come under my notice at the Hôtel-Dieu, some of which occurred in medical students, where both moral and physical depression were removed by the cure of the disease; and these facts are worthy of the observation of those especially who direct attention to mental and nervous complaints.

The prognosis in varicocele is not serious; as it does not tend in any way directly to shorten life.

Until recently the cure of this complaint has been regarded as impracticable, and practitioners were satisfied with recommending the use of palliative measures, such as cold and astringent lotions of various kinds, ice, &c.; but these, it is needless to observe, are of but temporary benefit. The use of a suspensory bandage becomes irksome to the patient; and yet without this simple arrangement he is unable to walk. Radical cure has, indeed, been accomplished, by castration; but this is paying dearly for the relief, and its recommendation is not justifiable.

The older surgeons, for the radical cure of varicocele, had recourse to cauterization of the veins, or they tied them or removed the varicose plexus. But these dangerous proceedings are condemned by all the celebrated modern surgeons of England, France, and Germany; and after the unfortunate experience of Delpech, it created some surprise that M. Breschet called the attention of the Academy of Sciences to a new method of radically curing varicocele. This process, however, is not obnoxious to the same objections, inasmuch as it is gradual and not sudden, in its operation; and thus the risk of extending phlebitis is obviated. More than two hundred cases have been thus treated successfully, without any untoward accident occurring. The following is the mode of proceeding.

In order that no vein may escape, the patient is directed to walk for some distance, or bathe the scrotum in hot water; and the scrotum having been carefully shaved, the patient stands up before the operator, who takes the scrotum in his left hand, and separates the vas deferens, drawing all the veins to the outer side. Great care must be taken not to exclude a single vein, but to leave the vas deferens and spermatic artery entirely isolated. An assistant then applies the upper pincers or forceps transversely, and as high as is compatible with the security of the penis; the blades are then tightened and firmly fixed by a screw, care being taken to leave a pedicle of skin on the outer side, about two lines in diameter. The second and lower pair of compressing blades is to be similarly applied as low as is consistent with the safety of the testicle.

The following case will serve as an illustration in point.

Varicocele of the left side; *chronic urethritis; operation and cure.* A. Dromer, aged 35, of feeble constitution and nervous temperament, was admitted into the Hôtel-Dieu, under M. Breschet. He had suffered for six months from a wearing sensation of weight on the left side of the scrotum, accompanied by dull pains in the corresponding lumbar region. He was also the subject of gleet.

The patient had been for some years affected by epilepsy, and fancied he had received some injury to the scrotum during one of these attacks. It also appeared that he had been addicted, when a youth, to masturbation.

The varicose tumour in this case presented nothing peculiar. At its maximum size it was about as large as a hen's egg; and the testicle of the same side was manifestly shrunk.

On the evening of the day on which the operation was performed, the gleet assumed an active character, the discharge becoming more abundant and darker in colour; at the same time great pain was felt in the scrotum and groin, and the patient could not make water without the use of the catheter.

On the following day the pain was less, but the testicle and epididymis were swollen. On the fourth day all the symptoms were amended, except that it was still necessary to pass the catheter.

On the thirteenth day, the compressing blades were removed, and it was found that the lower section was complete, but above the tissues were not quite cut through.

Subsequently inflammation of the bladder and erysipelas of the scrotum supervened, but yielded to appropriate treatment. At the expiration of another month the cure was complete.

SECTION VI.

ON WOUNDS OF THE HEART, THEIR CAUSES, SYMPTOMS, AND TREATMENT.

ONLY a few years ago it was considered an incontrovertible fact that wounds of the heart are instantly fatal, and many theses have been read before the faculty in support of this assertion. Even now, notwithstanding the cases collected at the Hôtel-Dieu and other hospitals, the contrary opinion is far from being generally admitted. It is, however, well ascertained by post-mortem examinations, that injuries involving the substance of the heart are not incurable, however deeply the instrument may have penetrated, or whatever cavity may have been implicated in the lesion. Plater has cited an instance in which the heart of a pig contained a piece of stick; and balls or manifest cicatrices have been frequently observed in the hearts of animals killed in hunting. The celebrated Harvey found a bullet in the heart of a stag. Latour, in his 'History of the essential and proximate causes of Hemorrhage,' (vol. i., p. 75), reports a very singular case of a soldier, in whom, six years after his cure, a ball was extracted from the right ventricle, near to the apex of the heart, and partly covered by the pericardium. Finally, individuals have recovered, in whom there was every reason to suppose, from the symptoms, that the heart had been wounded. These facts, and others I shall adduce, prove that wounds of the heart are not instantly fatal, and even that, under certain circumstances, they may be cured. Indeed, this conclusion is generally admitted by educated surgeons, as regards wounds penetrating the ventricles or auricles.

This remark is especially applicable where the injury is occasioned by a pointed instrument. For instance, M. Searle tried acupuncture of the heart, at Warsaw, in cases of cholera; and the introduction of the needle was accompanied by scarcely any pain, and followed neither by extravasation of blood nor inflammation. Doubtless such a finely pointed instrument only separates, without otherwise injuring the fibres of the heart; but the case is different where the injury is inflicted with an instrument at once pointed and cutting; although instances are on record, which demonstrate that even these serious lesions are not so immediately fatal as is generally proved. The following cases will illustrate this assertion, and likewise prove that death is not an inevitable consequence of even very serious wounds of the heart.

Case I.—*Wound of the right auricle, proving fatal after the lapse of several hours.*—On February 13, 1830, when the Duc de Berry was leaving the Opera, a man threw himself upon him from behind, and seizing his left arm and shoulder, turned him half round, and then pressing one hand on his back, plunged a dagger into his breast a little below the right nipple. The first sensation of the Prince was that he had received only a blow; but immediately afterwards, on touching the part, he cried out, "I am assassinated! I am mortally wounded! here is the dagger!"

Being conveyed to the interior of the house, he himself drew the dagger out of the wound, and the blood which had till then been retained, spirted out and covered his clothes—though not in such profusion as might have been expected: syncope followed.

The impulse of the first medical man who saw the Prince, was to bleed him, to relieve the oppression which evidently arose from effusion of blood into the chest; but a second surgeon thought it expedient first of all to try the effect of removing the clot which plugged the orifice of the wound. This was accordingly done, and the wound itself slightly enlarged below; after which, a small quantity of dark blood came away. This afforded scarcely any relief; and some veins were then opened, which, however, yielded very little blood. Cupping-glasses were then sent for, and suction in the mean time was orted to. When the cupping-glass was applied over the d, there was a larger discharge of dark blood which af- d evident relief. The patient was then conveyed to an- apartment, and the cupping-glass was again employed; elief thus gained was such that colour returned to the face, the pulse became stronger, respiration and articulation were easier, and the opened veins yielded six or eight ounces of blood.

This improvement was, however, but transient; and when I arrived, the oppression and other symptoms indicated imminent danger. I examined the dagger, and found it to be about six inches long, pointed, flat, and with cutting edges, but very rude in construction. It had evidently been thrust deeply into the chest. When asked where he felt the greatest pain, the Prince directed attention to the lower part of the chest, and said that the weapon had penetrated to his very heart.

We then examined the region of the heart: its beat was imperceptible to the touch; the pulse was small, feeble, and rose and fell at intervals. On percussing the chest, the left side was found to be distinctly resonant; but the right side, which corresponded with the wound, presented around this spot a fluctuating elevation of the skin, caused by extravasated blood, and yielded on percussion a dull sound, such as would be elicited by striking the thigh. As there had been no previous affection of the lung, the abnormal condition was attributed to effusion of blood on this side—a conclusion which the issue justified.

But a natural question arose, as to what was the source of this extravasation; it might be from a wounded intercostal artery; or was it from the lung, from the heart itself, or from one of the neighbouring large vessels? The dark colour of the blood which flowed from the wound excluded the first idea, and the absence of hemoptysis and emphysema, rendered the second at least very doubtful. It was surmised by some that one of the large venous trunks of the chest was opened; but of this there was no certain indication, inasmuch as all the symptoms present might be as reasonably referred to a wound of the heart itself.

It was evident, however, to all, that something must be done, and that promptly, if life was to be prolonged. The alternatives presented were, to close the wound and thus arrest the hemorrhage, to wait for fresh symptoms, or to facilitate the escape of the blood, the continued accumulation of which threatened a speedy and fatal issue. The urgency of the dyspnœa led to the adoption of the last of these alternatives.

With the view of affording the required relief, an incision was made through the skin, and the finger, being guided by the track of the wound, reached the point at which the dagger had pierced the intercostal muscles. The weapon had penetrated the fourth intercostal space, and had been plunged in with such violence as to notch the opposed margins of the two ribs between which it entered. Thus it was evident that a deep wound had been inflicted, but we were still in the dark as to what parts were involved in the injury.

As soon as the wound was extended, a considerable quantity of dark blood flowed from it, and saturated the linen with which I covered it, to prevent the access of air. The breathing became easier and less painful; and no air escaped from the wound.

Again, a question was raised whether leeches or bleeding from the arm should be tried; but the feebleness of the patient forbad this. And the suggestion that the wound should be exposed to the air was rejected as dangerous. Ultimately, it was decided that the best course was not to disturb the patient, to keep the wound covered, and to favour the escape of the extravasated blood, by inclining the body towards the right side; awaiting the occurrence of other symptoms which might lead to a variation in the treatment.

Soon, however, extreme thirst supervened, accompanied by intense pain in the epigastrium, the back of the head, and the bowels. Vomiting and purging followed; and the heart's action and respiration became more and more feeble. The fatal instant was accelerated by a change of posture. "Turn me," exclaimed the Prince, "I cannot bear my present posture any longer." A vain attempt was made to dissuade him from this change; his only reply was, "turn me." Up to this moment he had been resting on the right side, so that the left and sound lung had been left free and uncompressed, and had thus sufficed, alone, to support life. But immediately the patient's wish was complied with, he became insensible, and death speedily ensued.

When a wound of the kind just described does not involve parts essential to life, it may nevertheless prove fatal in various ways. But it is usually not till after the lapse of several days that dangerous inflammatory symptoms occur. On the contrary, when such vital organs are involved, death is the almost immediate consequence.[1] It was thus that Henri IV lost his life.

On examining the body of the Duke, the following appearances presented themselves. The dagger had entered the chest between the fifth and sixth ribs on the right side, and passed through the anterior part of the right lung; it subsequently penetrated the pericardium and traversed the right auricle of the heart, stopping short at the central tendon of the diaphragm. Two pounds of blood were extravasated into the right side of the chest.

A natural question arises, how life could be at all prolonged with so serious a wound of the heart. Probably, the fact of the right or venous side of the heart having been the seat of the lesion may afford some explanation of this apparent anomaly. In the case of Henri IV, who received a similar wound, the monarch expired without giving utterance to a single word. The weapon had taken a similar direction, that is, it had pierced the lung and auricle; but the blow being struck on the left side, it was the left side of the heart that was wounded: whereas, in the Duc de Berri, the right auricle was opened. This circumstance probably accounts for the speedy issue in the one instance, and the prolongation of life in the other.

In my lectures on gun-shot wounds, I have narrated the case of a man named Géray, in whom the left ventricle of the heart was pierced to the extent of 3½ lines; but who, nevertheless, survived for eight days, and would probably have recovered, had not softening of the left hemisphere of the brain supervened. In this instance there was no inflammatory effusion into either chest or abdomen, and the blood extravasated into the chest did not appear to be of much importance; therefore, taking these circumstances into consideration, in conjunction with the hemiplegia and disturbed mental functions of the brain, it is difficult to evade the conclusion that the fatal issue was due to the cerebral lesion. In another part of my lectures, on "Traumatic Emphysema," I mention a case of laceration of the pericardium, accompanied by penetrating wound of the right ventricle of the heart by a fragment of a fractured sternum; here death did not ensue until the twelfth day.

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[1] Such, at least, was the general opinion at that time.

The case of a man named Sénart, published by M. Ferrus in the *Répertoire général d'Anatomie et de Physiologie*, is closely allied to the preceding. The patient, who was the subject of habitual melancholy, attempted to commit suicide by thrusting a long, thin, and sharp instrument into his left side between the fifth and sixth ribs: the weapon remained in the wound. The wound healed, and the patient survived till the twenty-third day after the infliction of the injury. On examining the body, a stiletto was found fixed in the front and lower part of the left ventricle; it had penetrated to the depth of 18 lines from the surface of the heart, transfixing the left ventricle and ventricular septum, and projecting into the right ventricle.

Thus, it is evident that these wounds of the heart are not necessarily and immediately fatal, and may even be cured. Nevertheless, in calculating the chances of a cure, it is essential to bear in mind the depth to which the weapon has penetrated, the direction which it has taken, and the thickness of all the tissues involved in the wound; the form of the weapon, and its retention in or removal from the wound should not be lost sight of.

Let us consider these various points more in detail. Wounds of the heart differ in regard to their extent and position: they may be superficial or deep. The former involve only a part of the thickness of the walls of the heart, whereas the latter completely perforate them. There are some cases on record where the wounds have implicated the parietes of more than one of the cavities.

The direction of the lesion may be such as to divide transversely the greater number of the fibres through which it penetrates, or the reverse may be the case; and the tendency of the wound to gape, more or less, will depend on this circumstance. Thus, when the division of the fibres is transverse, the separation of the edges is more considerable, and the risk of extravasation of blood is much greater, than when the wound is parallel to the course of these fibres. But, as the heart consists of several layers of fibres taking different directions, it is evident that, in perforation of the cavities, the tendency to separation of the lips of the wound in one part is counterbalanced by an opposite condition in another. Thus, if the left ventricle, for example, be perforated, and the wound extend from the anterior wall of the cavity obliquely towards the left side of the heart, three planes of fibres would be implicated. The superficial and middle are directed downwards and towards the left side; the deepest, which exceeds the other two in thickness, crosses them at right angles; and the penetrating weapon which has cut transversely the deepest plane, has only separated in its passage the other layers which are parallel to the wound inflicted,—a circumstance which, of course, constitutes an obstacle to the risk of extravasation, and greatly increases the chance of a permanent closure of the wound.

The magnitude of the wound, again, has an important influence on the issue of the case; and this depends on the size and form of the instrument with which it is inflicted, and on the force with which the blow is given. Thus, a ball makes a round wound; a sharp, flat and cutting weapon, a linear wound; or the parts involved may be torn by the penetration of an angular or irregular body. Every part of the heart may be wounded; but the left cavities are less obnoxious to injury than the right. Again, the right ventricle is more frequently opened than the corresponding auricle; and the same observation applies to the left side of the heart. The anatomical relation of these several cavities accounts for these facts. Sometimes the wound is found in the groove lodging the coronary arteries, both anterior and posterior; and the hemorrhage, in such case, is most serious. The thickness of the walls of the left ventricle renders this cavity less liable to be opened than the others; and if implicated, supposing the extent and direction of the wound and other circumstances to be the same, there is a better chance of the aperture being closed by approximation of its lips.

Wounds of the heart may be complicated by accidental concomitants, such as division of an intercostal artery, lesion of one of the large vascular trunks, a large opening into the chest, or wound of the lungs, diaphragm, or some one or more of the abdominal viscera. Moreover, we should not lose sight of the moral condition of the patient at the time of the infliction of the injury, his age, constitution, &c.

It cannot, however, be doubted, that wounds which implicate the substance of the heart, are, in general, very serious. Immediate or secondary hemorrhage, from various sources, may prove fatal; or this consequence may result from inflammation of the heart, or pericardium, or of some neighbouring organ, or even from sudden cessation of the heart's action. It is not essential that the walls of the heart should be entirely divided to cause death; an incomplete, and even very limited, division may suffice to entail this result, as is proved by the autopsy of the famous Latour-d'Auvergne. But, whatever may be the nature of these lesions, it is certain that, in many instances, death is not instantaneous; in others, the nature of the injury may be overlooked; and in some cases, there may be even recovery. The following cases illustrate, in a very interesting way, some of the preceding remarks.

Case II.—*Wound of both ventricles. Death after the lapse of twenty-five days.* A man, 40 years of age, of large frame and dark complexion, who had been reduced to a state of great misery by misfortune and misconduct, determined on self-destruction. Having been thwarted of his intention to drown himself, and subsequently thrown into prison, his despondency prompted him to cut off his penis with a blunt knife, with which he had provided himself, close to its root. The hemorrhage was not considerable; but when he was discovered to be bleeding he was brought to the Hôtel-Dieu. Ligatures were applied to all the bleeding arteries, and the wound was simply dressed, a catheter being introduced into the bladder.

The patient was carefully watched, as his apparent tranquillity was suspected to cover a determination to renew the suicidal attempt.

After some days the calm was succeeded by delirium. The patient rose from his bed, tore off the dressings, and ran about the ward. He was bled in the foot, and had administered an opiate injection and a gentle laxative. Still the delirium continued; his face became pinched, and his strength rapidly diminished. Pulse generally slow; extremities cold; respiration free, and attended by neither cough nor expectoration. The urine passed freely, and the wound seemed healthy. The symptoms of cerebral excitement increased during the last three days of his life; and he died, comatose, three weeks after this self-mutilation.

Necropsy.—The membranes of the brain were loaded, and the brain itself injected and firm. On raising the sternum, a large patch of ecchymosis was observed on the pericardium; and the bag itself was found half filled with fluid blood. On seeking whence this blood came, several small wounds were perceived on the anterior surface of the ventricles, plugged with dark fibrinous clots. This led to a suspicion of the truth, which was placed beyond doubt by a further examination. In the centre of the ecchymosis, which occupied the front and upper part of the pericardium, two minute penetrating wounds were discovered, partly obliterated by false membrane. On directing attention to the front of the chest, a small cicatrized wound was found between the second and third ribs of the left side; it was nearly round, and not more than a line and a half in diameter. Beneath the skin, and between the intercostal muscles and pleura, a large ecchymosis was discovered, extending downwards and forwards. The opening in the pleura was indicated by a reddish-brown spot, surrounded by false membrane. The anterior border of the lung had not been implicated in the wound.

The small wounds in the heart itself were five or six in number, and chiefly in the right ventricle into which they evidently penetrated. One of these could be traced into the ventricular septum, and another into the left ventricle, which, however, it did not penetrate. The substance of the heart was pale, and readily broke down under the pressure of the fingers. The ventricles contained some dark fibrinous clots.

The whole of the gastro-intestinal mucous membrane was the seat of chronic inflammation; and there were several patches of ulceration in the neighbourhood of the ileo-cæcal valve. The mucous membrane of the bladder was red, thickened, and granular. The other organs were healthy.

On inquiry, it was learned that, when this man was found mutilated in prison, in addition to the knife with which the mutilation was accomplished, he had in his possession a long needle, such as is used in his occupation of a saddler. This was taken from him, and he had afterwards no opportunity of providing himself with a similar instrument. It was therefore indubitable that this attempt at suicide must have been made at least twenty-five days before his death; and the condition of the external cicatrix entirely agreed with this calculation.

The instrument, which was fine and very sharp, must have been pushed in vertically, and directed towards the heart; and on reaching this organ it must have been plunged at various points into its substance, as the appearances presented would seem to prove. The minuteness of these wounds did not allow of the escape of blood from the cavity of the ventricle; but that which was found in the pericardium (about three ounces) escaped, I apprehend, from the substance of the heart itself.

This patient's pulse, which was often felt, presented nothing remarkable; and the heart's action was natural, as were the sounds. There was neither fainting nor dyspnœa, nor indeed any symptom which could lead to the suspicion that the circulating centre had been the seat of any lesion whatever.

The peculiarities of this case suggest to me some remarks on the form of self-mutilation practised by the unfortunate subject of it. These voluntary mutilations of the genital organs are of not infrequent occurrence; and they constitute a very singular variety of suicidal monomania. The individuals who commit the act are usually of an erotic disposition; and are under the impression that any serious injury of these parts must be fatal. All the authors who have treated of madness have alluded to this form of attempted suicide, and agree that these mutilations are not, in themselves, dangerous. Such maniacs require close watching, as they generally succeed in ultimately destroying themselves. Many have been known to attack others with the same blind rage with which they have attacked themselves. It would appear that the sensation of pain is weakened, if not actually annihilated. An indifferent knife, with an edge more like a saw, must inflict, one would suppose, horrible torture; yet nothing seems to stop them from accomplishing their purpose. The arteries thus lacerated do not bleed freely, and the retraction of the parts aids in arresting what hemorrhage there is; or, perhaps, the patient faints. In many instances the cure is purely spontaneous. Every variety of mutilation may occur, including either partially or completely all the external organs of generation. Thus, I have seen one case in which the wound was inflicted at the base of the scrotum and penis, which were divided through two thirds of their extent. The parts were brought together with points of suture, and the patient recovered, with one corpus cavernosum obliterated. In another instance, complete obliteration of the anterior part of the corpora cavernosa followed the tight application of a ligature around the penis.

Jealousy is one of the most common exciting causes of these mutilations. A monomaniac of this class came under my notice, who entirely cut off both testicles with the scrotum. He quickly recovered; but afterwards drowned himself. It is difficult to conceive what can be the motive impulse to such an extraordinary act, under these circumstances. But, to return from this digression, I will now narrate a case very much resembling the preceding, but in some respects still more interesting.

CASE III.—*Wound of the left ventricle terminating fatally after three days.*—A man, about 30 years of age, determined, in a fit of jealousy, to destroy himself; and the instrument he used for the purpose was a file, which he had sharpened at the point, and with which he stabbed himself six or seven times, principally in the precordial region. The patient lost blood by the mouth, but much more by the wounds. When brought to the Hôtel-Dieu, on March 8th, 1832, it was observed that a quantity of air escaped by the wounds, a circumstance which left no doubt of the chest having been penetrated. His breathing was short and feeble, his pulse small and irregular, and the patient was altogether so prostrated, that it was out of the question to bleed him at that time. When reaction took place, he was bled; and this operation was repeated each time that an exacerbation recurred.

Thirty-six hours after the injury was inflicted, a remarkable circumstance occurred. The patient began to spit up a thick expectoration of mingled pus and blood. I thought it advisable to dress the wound, with a view of thereby preventing the ingress of air and of stopping the bleeding. In so doing I acted upon the principles which M. Larrey had some years before laid down; and I cannot say that this step had the effect of increasing the dyspnœa; but, on the contrary, the patient seemed to be going on pretty well under the treatment adopted. But this favorable appearance was not of long duration, for the unhappy man died after the lapse of three days from the receipt of the wounds. I was never deceived as to the very serious nature of the case; but I have no doubt that the fatal issue was hurried by an interview with his mistress and a commissary of police, about three or four hours before his death.

Autopsy.—The integuments over the precordial region were pierced by five triangular wounds, corresponding in form to the instrument with which they were inflicted. In noticing this point I would observe that, in a medico-legal point of view, we ought not to lose sight of the fact that a round instrument may produce wounds of a similar form. In pursuing the examination, two of the wounds were found to be above the nipple, and three below it. All of these were regular, with one exception; a fact which proves that each was made by a single blow. This is not always the case; for sometimes the determination of the suicide to accomplish his purpose induces him to plunge the weapon again deeply after partially withdrawing it; by which an irregular wound is produced, or the internal wounds may be more numerous than those which implicate the integument only.

The highest of these wounds appeared to have been inflicted with more violence than the others, for it involved a part of the adjoining rib, and then penetrated the intercostal space. There was a considerable quantity of blood extravasated into the pleural cavities. On the left side there was air mingled with blood, partly in a fluid state, partly coagulated; and this effusion, including what had escaped by the wound, might be computed at three or four pounds. This blood would, no doubt, have all found its way out, if the wound had been left open, instead of being closed. As it was, the lung, being encroached upon from all sides, was compressed and no longer permeable to air, as occurs in emphysema.

The left side of the pericardium exhibited three or four apertures, and its interior contained about a table-spoonful of blood mixed with pus, the product of inflammation. The instrument had pierced through the left ventricle in three places.

Was the left lung wounded? It was my impression that it must have been so; and in order to ascertain the fact it was inflated, and the air escaped at three several points, corresponding exactly with the external wounds.

The right ventricle contained some clots of blood, but was unwounded.

I now proceeded to examine the interior of the left ventricle to discover, if possible, the exact points at which the weapon had entered the cavity. I was guided in this difficult search by a clot of blood, evidently formed during life, which adhered to the side of the cavity; and by introducing a probe from without, the internal orifices of three penetrating wounds were discovered.

These various lesions, together with the evidences of pleuritis, were sufficient to account for death. But here another question presented itself. From what source was the blood supplied which had escaped from the wounds, and which had been found in the chest? The lungs had not furnished it, but it had been derived from the wounded intercostal artery.

The foregoing case confirms the opinion that wounds of the heart are not necessarily fatal. The patient had lived upwards of seventy-two hours, although he was the subject of three penetrating wounds of this vital organ. The preceding cases prove that life may be protracted for even a much longer period. A multitude of other instances might be cited to show that penetrating wounds of the right ventricle may be survived two, three, four, five, six, and even fourteen days. Other cases no less remarkable, and also noticed in M. Alph. Sanson's thesis, prove that penetrating wounds of the left ventricle have been survived five hours; and that in others, where both ventricles have been involved, the patients have lived for five, or even twenty days.

In the face of so many and such authentic instances, it cannot be asserted that wounds of the heart are immediately or necessarily fatal. The case of the soldier, which was cited at the commencement of this article, is still more conclusive, as it leaves no doubt as to their curability. I do not mean, however, to imply that these injuries are otherwise than extremely serious; all I mean to affirm is, that they are not altogether hopeless.

The symptoms of wounds of the heart are not all of equal moment; some are of doubtful import, whilst others are more characteristic. The uneasiness which would be excited by the existence of wounds in the precordial region, would be enhanced by the occurrence of symptoms of hemorrhage, such as general prostration, syncope, a small pulse, pallor, cold extremities, vomiting, cold sweats, anxiety, sleeplessness, oppression, and a sensation of great weight on the diaphragm. Other symptoms have been enumerated as characterising wound of the heart; these are, a peculiar tremor of this organ, an unequal and feeble pulse, violent fever, &c.

The diagnosis of wounds of the heart is by no means easy, because the symptoms which distinguish them are rarely met with in combination, and it is the doubt which hangs over such cases which has led, probably in a considerable number of instances, to the cure of penetrating wounds in this organ being overlooked. Nevertheless, there is no doubt as to the fact of such cures having been effected; it may, therefore, be laid down as a general rule of practice, that wounds of this nature, however serious, should be treated as if they did not penetrate the substance of the heart.

The treatment to be adopted, under these circumstances, is such as would apply to all deep wounds of the chest, accompanied by lesion of some one of the great vessels in this cavity. Bloodletting, rest, a simple dressing of the wound, so as to prevent the escape of blood and the ingress of air; sometimes enlargement of the wound or tapping, and the employment of cold, and exhibition of acidulated drinks.

The abstraction of blood should be accommodated to the power of the patient and the dypnœa of which he is the subject; and we may hope thereby also to combat the inflammation which may affect the pericardium, the heart itself, or any other wounded organ. Great caution should be enjoined as to diet and exercise, until a considerable time has elapsed, in order to avoid the risk of detaching a loosely adherent clot, or tearing open a fresh cicatrix.

PART II.

ON DISEASES OF THE RECTUM.

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SECTION I.

ON THE EXCISION OF HEMORRHOIDS.

THE lower extremity of the rectum is, in a great many persons, the seat of vascular swellings, to which the name of Hemorrhoids has been given.

These tumours may exist during the entire life-time of the subject of them, without being the source of any considerable inconvenience; but not infrequently they give rise to more serious consequences, involving even a fatal issue, if not attended to and relieved. Thus, the celebrated Copernicus and Arius died of hemorrhage consequent on a rupture of hemorrhoids; and many similar fatal cases are recorded by various authors. The risk of such a termination was also known to the ancients, who proposed various modes of treating the disease, and amongst others the ligature. Thus, Hippocrates recommends the employment of a strong ligature, with which all the hemorrhoids but one should be tied. "You must not cut them," adds this author, "but you may hasten their separation by appropriate local applications." Paulus Ægineta gave the same advice. Celsus thinks that the nail or scalpel should be used to assist in the detachment of the tumours when tied. I cite these opinions simply to prove that the ancients were aware of the dangers attending these hemorrhoidal affections.

Before passing in review the various modes of treating these diseases, it is desirable to say a few words respecting their nature and anatomical structure, and to point out the class of cases in which the treatment I am about to speak of is applicable.

As regards their nature, a great variety of opinion exists. Some suppose the disease to have its seat in the capillary vessels, without involving either arteries or veins. Others again,—as Duncan, Le Dran, Cullen, &c.,—regard them as cysts into which the blood is poured. Lastly, Stahl, Albertus, Vesalius, Morgagni, Petit, and Boërhaave, consider them to be dilated veins, true varices; and this is my opinion also.

If we examine the composition of these hemorrhoidal swellings, we find that they are distinguishable into internal and external.

Internal piles are covered by mucous membrane of a livid hue, and form a sort of partition in the rectum; they present sometimes grooves in their intervals which facilitate their isolation, but which at other times are absent in consequence of being obliterated by inflammation. Even the tissue of this membrane exhibits varices like the heads of pins, which, when they are cut, allow of the exudation of venous blood, and thus impart a spongy appearance to the diseased surface. On raising the mucous membrane, an organized false membrane is brought into view, or else cellular tissue. Lastly, the muscular coat is external; and large arterial trunks are frequently seen spread out over these coverings.

External piles, which arrange themselves in an annular form around the anus, are constituted,—first, externally, in great part by the rectum, and to a limited extent by the skin; secondly, by the false membrane which often exists in connection with internal piles, or by the filamentous investment which appears then to be continuous with the superficial fascia; thirdly, by the dilated veins themselves; fourthly, by the sphincter muscle, which embraces the pedicle, and spreads over the surface of the tumours; fifthly, by nervous filaments which creep over their surface; and lastly, by fat, which is sometimes interposed between them and the superjacent skin.

There is no doubt that age and sex exercise an influence over the production of hemorrhoids. By some authors, they have been described as belonging exclusively to the adult period and commencing old age; and that they are never met with in early youth, though partial prolapse of the rectum has been mistaken for them. Others, on the contrary, have recorded cases even in very young children. Again, some affirm, and others deny, that the displacement of the uterus during pregnancy, and a constipated state of the bowels, specially dispose women to this affection.

But the practical question is, which cases are we to leave alone, and which to attempt the cure of by surgical measures.

It is clear that we have no business to meddle with hemorrhoids in individuals who are prostrated by organic disease of the bowels, liver, or, above all, of the lungs. It is, indeed, an ascertained fact that, in certain subjects, in whom the phthisical tendency is more or less developed, the progress of this disease is suspended for a longer or shorter time by the presence of hemorrhoids; and that their ill-timed suppression has stimulated the organic affection to resume its destructive inroads. Hemorrhoids make their appearance, in pregnant women, often towards the period of their confinement, or as a consequence of labour; but, in such cases, the cause is evident, and the effect ceases with its removal.

I may further remark that, so long as piles do not exhibit degeneration in their tissue, and are not the source of hemorrhage or copious sero-purulent discharge, by which the patient is thrown into a marked and characteristic state of anemia, surgical interference is not justifiable, as antiphlogistic measures are alone sufficient to relieve the annoyance they occasion. But, where serious inconvenience attends this complaint, and life itself is threatened, then more decisive measures must be adopted for the removal of the degenerated hemorrhoidal excrescences.

Internal and external hemorrhoids may be met with either separately or in combination, and present the appearance of tubercular projections arranged around the lower extremity of the gut, either within or without the anus. Externally, they are characterised by their rounded prominence and covering of dark skin; whilst, internally, they are invested by a covering of bright-red mucous membrane. In the former position, they rarely ulcerate; but in the latter, frequently: and the consequence of such ulceration is loss of blood, and the discharge of serum and pus, by which the patient is much worn and prostrated.

Internal piles, which are situated entirely above the anus, are often strangulated by the sphincter muscle, in consequence of their turgid condition and the prolapse of the lining membrane of the bowel; they likewise present the same external character derived from their mucous investment, and also yield blood or pus from their surface when the seat of ulceration. As I have already remarked, in some instances both forms of hemorrhoids coexist in the same subject.

Individuals afflicted with this complaint walk with difficulty: they may be seen carrying the hand to the seat of suffering, or sitting down to aid thus in returning the protruding mass. But the relief obtained is only temporary, and the suffering is renewed as soon as the turgid vessels again descend.

The debilitating effect of the discharge accompanying these swellings is evidenced by the emaciation of the patient, and the wan, discoloured, and wax-like tint of the skin. In two individuals in the Hôtel-Dieu, a bellows-sound was distinctly audible when listening to the heart; and in one of these patients this sound could be traced upwards in the course of the carotids. Such persons have the aspect of patients suffering from other forms of hemorrhage, or worn down by excessive suppuration: their spirits become painfully depressed, their intellect is weakened, and a tendency to commit suicide is induced. As the local complaint advances, the lower part of the bowel assumes a scirrhoid character, and death finally ensues if measures be not adopted to arrest the disease.

Under such circumstances an operation affords the only prospect of relief: but what should this operation be? For the radical cure of hemorrhoids, compression, cauterization, the ligature, or the knife, have been recommended and employed. I will refer, in succession, to these different plans of practice.

There can be no doubt about the possibility of obliterating these diseased vessels by pressure, if it could be effectually applied: but this is the difficulty; and therefore this attempt has been abandoned. The ligature, as I have mentioned, has been recommended and adopted for a long time past; and this mode of treatment is attended with great risk, on account of the inflammation which it engenders, and the excessive suffering it entails. Sometimes even a fatal result follows its use, as in a case recorded by J. L. Petit. Cauterization has been frequently had recourse to. Although of undoubted value as an adjunct to excision, it is both excessively painful and dangerous when employed alone on tumours of large extent, which cannot be dealt with except by the prolonged action of the heated iron. Shaving off or clipping the tumours with scissors has had its advocates. But this partial proceeding is attended by the risk of hemorrhage and inflammation, whilst the disease is not eradicated; and therefore I do not consider it justifiable. Excision of the morbid mass is the mode of treatment to which I give the preference; and I now proceed to describe how this ought to be accomplished; and subsequently I will mention the difficulties and risks attending it, and point out how they are to be met and combated.

When the operation is decided on, I make the patient lie down at the edge of his bed and on his side, or on his elbow and knees with the leg extended, or, better still, with one of the legs completely bent on the thigh, and the other extended. If the pile is external, I direct him to strain violently as when at the water-closet, and in this way it is forced out. The tumour is then seized with a strong pair of forceps, whilst an assistant separates the nates, and with a long pair of scissors, curved on the flat, the tubercles are excised with very little difficulty. I make it a rule to remove only a portion of the tumour which projects; for, if the whole be taken away, there is risk of serious hemorrhage, and subsequent constriction at the anus. In proceeding as I have described, there is, in appearance, a very considerable mass left at the orifice of the bowel, which would give the impression that a sufficient quantity had not been removed; but when the part heals, that which is left assumes its normal position, and the anus regains its natural state. In fact, the same result attends this operation as that which follows a similar one on the tonsils.

When the pile is internal, its excision is attended with rather more difficulty. In order to procure its extrusion so as to be able to remove it completely, it is requisite, in the first place, that the patient should sit down in a hot bath, and make every effort in his power to force down the bowel. As soon as this is effected, he must place himself quickly in the posture I have described, and the operator must lose no time in seizing and excising the diseased portion with the scissors.

Before the operation, it is my custom to administer a mild purge and an injection. I shall presently notice why I consider this precautionary measure essential.

The excision of hemorrhoids is not free from some inconveniences, and even danger; but the latter can happily be surmounted by the adoption of suitable measures.

The danger to which I refer is that of hemorrhage. In external piles the bleeding is likewise external, and, being readily discovered, may be as speedily arrested by the employment of the actual cautery. The same course must be pursued where the hemorrhoidal tumour is internal; but in this case the employment of the remedy is not so easy, and the bleeding may go on without being detected. When there is good reason to believe that the patient is bleeding internally, he must be directed to empty the bowel of the blood by the same effort as he makes in having a motion: a cold injection is then to be administered. The patient's straining will bring the bleeding wound into sight, and then the cauterizing iron, heated to a white heat, must be applied to it. This is effectual; and I have never seen any dangerous consequences follow its employment. I always make it a practice to leave an intelligent assistant to watch the patient, and to apply the cautery as soon as it is needed, should hemorrhage arise.

I have been asked whether it is not better, in every case and immediately after the operation, to cauterize the part, rather than wait till hemorrhage occurs. I am disposed to think it is, inasmuch as in the numerous cases on which I have operated, both in public and private, about two fifths of the whole have suffered from bleeding afterwards when the cautery was not used; whereas, I have never known this consequence where the part was cauterized at the time. The question, therefore, resolves itself into an estimate of the danger attending, severally, hemorrhage and the use of the cautery. But I am of opinion that the risk of the latter bears no comparison to that of the former; for the inflammation and swelling following the cautery, and the sympathetic irritation of the rectum and urinary organs, generally yield to simple measures, and never lead to serious consequences; but internal hemorrhage, on the contrary, frequently imperils a patient's life. Further, as it is impossible to ascertain, *à priori*, whether a patient will bleed or not, I am disposed so far to modify the practice I have generally pursued, by adopting and recommending the use of the actual cautery in all cases where the operation of excision is performed.

Another, but less certain, mode of stopping the bleeding, consists in the introduction of a pig's bladder into the rectum: this is then stuffed with charpie. Although this plan succeeded the first time that I had recourse to it, I cannot recommend it, on account of the inconvenience it occasions to the patient, and the risk of its being almost certainly expelled in the involuntary efforts which are provoked by its presence.

The other accidental concomitants or sequences of excision are far less important. There is always considerable swelling of the adipose and cellular tissue about the anus. The chief inconvenience of this tumefaction is the irritation which it excites in the rectum, in consequence of which patients are unable to empty the bowel for the succeeding four or five days. And here the object of the aperient prior to the operation becomes manifest; for, the previous free evacuation of the bowels, together with the spare diet allowed afterwards, render it unnecessary that they should be disturbed for the first few days. Again, this swelling may occasion retention of urine; this, however, may be readily relieved. As to the tumefaction itself, leeches, fomentations, &c., may be had recourse to if necessary.

As to the pain accompanying this operation, it is sharp but momentary, and is of very little importance as contrasted with the previous suffering of the patient, and the purpose accomplished by the surgical interference.

Other circumstances, less directly consequent on the operation, demand the attention of the surgeon, and should not be lost sight of. I have observed that patients suffering from the continuous drain of blood, serum and pus, which severe hemorrhoids entail, become reduced to a miserably asthenic and anematous condition. Now, such discharge, where it has been of long continuance, cannot be suddenly arrested without a morbid reaction on the animal economy, producing a general state of artificial plethora, congestion in the lungs, liver, or brain, and consequent disease in one or other of these organs. Sometimes patients are attacked by fainting fits, spasms, and even insensibility; and the arteries beat with such violence, as would lead to the suspicion of the existence of an aneurismal diathesis, were it not for the constantly changing character and seat of these pulsations. And, which is remarkable, this state of plethora coexists with a pale, or rather a yellow, earthy tint of the skin, and especially of the face, together with marked debility in the patient.

The repeated application of leeches, for some time and at short intervals, is desirable when the patient is young and vigorous, and where the discharge has been of a sanguineous nature; or, where it has been of a purulent character, an artificial drain should be established; or even the two may be combined, where the case seems to call for it: these remedies, together with mild laxatives often administered, constitute the most rational treatment to prevent the ill effects of a plethora which might otherwise prove seriously dangerous.

When the excision of an external pile has been accomplished, the resulting cicatrix, which is dependent on the constriction of the sphincter itself or of the anal integument, suffices, in the great majority of cases, to oppose the descent of any internal hemorrhoidal tumour; and in that case a similar operation upon the latter may be dispensed with. As regards internal piles, excision is equally efficacious, and the patients are permanently cured by it.

Excision may, however, be followed occasionally by too great constriction of the anus. J. L. Petit records a case where the narrowing was such that the pipe of a syringe could scarcely be introduced. Such an accidental result may be obviated by keeping the aperture dilated as long as may be needful.

I will now illustrate the principles I have laid down, by the selection of a few from amongst the numerous cases I have treated, both in private and in the hospital, in this way.

Case I.—*Excision of hemorrhoids, followed by hemorrhage.* —Melleville, aged 36, a shoemaker, of pretty good constitution, had been the subject of hemorrhoids for twelve years. He ascribed their origin to a residence in Champagne, where he had freely indulged in the wine of the country. He then came to Paris, where he worked hard at his trade, sitting of course almost all day long. The hemorrhoidal flux had for some time been periodical, returning every month, or even every fortnight, and lasting for some days; so that the loss of blood in large quantities and the abundant discharge of mucus seriously affected his health, reducing him from a robust, hale man, till he became pale and emaciated. Latterly, all his symptoms had become aggravated; the hemorrhoidal tumours had acquired an immense size, and there was acute inflammation of the anus, accompanied by obstinate constipation and retention of urine. He had been twice bled at home, but with scarcely any relief, and then he presented himself at the Hôtel-Dieu.

When admitted, he could scarcely walk, on account of his weakness and acute suffering. On examination, a large hemorrhoidal swelling, of the size of a hen's egg, tense, and of a livid red hue, was found protruding and, as it were, strangulated by the anus; it appeared to be bordering on gangrene. The patient's abdomen was, moreover, tense and tender; there was retention of urine, intense fever, and an anxious countenance.

The first care was to place the patient in a bath, and to employ opiated applications to the anus; some relief was thus obtained, and he was able to pass his water, though but little impression was made on the swelling; I therefore proposed the operation of excising the diseased mass.

There is no doubt that, under these circumstances, the existing crisis might have been surmounted by leeching, fomentation, injections, rest, and appropriate diet; yet neither can it be denied that such treatment can only be regarded as palliative, and that a recurrence of all the distressing symptoms must certainly be looked for sooner or later. But, it may be asked, why not have recourse to similar palliative measures at each return of the attack? This plan is adopted by many surgeons, and is preferred by a great number of patients who dread the knife; it is true that, in some instances, these palliative measures defer the attacks and render them less frequent; but more often they increase both their intensity and frequency, and thereby more rapidly impair the patient's health. Whatever value may be attached to such temporising treatment, the risks attending the persistence of the disease far outbalances the apparent advantage. For hemorrhoids, both external and internal, may assume a scirrhoid character; or the latter may extend so far up the rectum as to get beyond reach, and thus the process of degeneration involves more and more of the intestine. These local, in addition to the constitutional, effects of the disease, remove all hesitation in my mind as to the proper course to pursue in these cases.

But let me guard my readers against inferring that I intend to recommend the operation of excision indiscriminately in all cases; I have already pointed out the circumstances under which the disease should be removed, and those which indicate the propriety of not meddling with it.

To return to the case. The patient having assented to an operation, he was placed on a bed, with his abdomen supported by a pillow. The hemorrhoidal tumour, which was already very prominent, became more so when the patient was directed to strain. Two rows of hemorrhoids were then very distinctly brought into view; one set external, invested partly by skin and partly by mucous membrane, the other internal and having their seat entirely within the bowel. The excision of these tumours was accomplished with a pair of scissors curved on the flat, care being taken in the removal of the external portion not to cut away too much integument, lest the anus should be thereby too much contracted when the part healed. There was some surface bleeding, but as it seemed to stop spontaneously, the part was not cauterized.

I was desirous in this case to avoid increasing unnecessarily the inflammation in the rectum, and therefore I did not at the time employ the cautery, as indeed then it did not appear requisite. Moreover, I may remark that there is something very alarming to patients and their friends in the heating and employment of the cauterizing instrument. Nevertheless, I had my misgivings that hemorrhage might supervene, and therefore left a competent assistant with the patient, instructing him how to proceed in case of necessity. I may also remark that, in such cases as the present, I do not apply any dressing to the wound at first, as it would tend only to confine the blood, if any escaped, and thus to mask the real state of things. External hemorrhage is easily dealt with; but the heat of the bowel naturally favours internal bleeding, which is therefore to be much more feared, both on this account and because it is so insidious and more difficult to control.

In the present instance, bleeding of this kind occurred. It was characterised by the following symptoms, exhibiting themselves about an hour after the operation: a tendency to drowsiness and stupor, tingling of the ears, heat and tension of the abdomen, especially in the left iliac fossa, tenesmus, and frequent desire to evacuate the bowels, without the ability to do so. Presently other and more marked symptoms supervened; a deadly paleness overspread the patient's face; he had rigors and frequent fainting fits; the pulse became almost imperceptible, and a cold, clammy sweat bedewed the skin. Such indications it was impossible to misinterpret; there was hemorrhage going on within the bowel, and to such an extent that it must speedily prove fatal if not arrested.

With this view two injections of cold water were administered, to stimulate the rectum to part with its contents. This end was satisfactorily accomplished, and a large quantity of clotted blood was discharged. At the same time the bowel was sufficiently forced down to bring the bleeding surface, which was near the anus, into view. The red-hot iron was then applied to this part. The pain attending its employment was very acute, but the bleeding was immediately arrested. Warm clothing and sinapisms to the legs restored the patient, and he soon felt much better; but the smarting pain continued, accompanied by constipation and retention of urine.

All these symptoms gradually subsided. The pain diminished under the employment of emollient applications; constipation was relieved by the use of castor-oil; and though the first motions occasioned suffering, they did not cause any bleeding. The retention of urine, which resulted from an extension of the inflammation from the rectum to the neck of the bladder, required for some days the use of the catheter; but this also subsided, under the use of tepid baths, fomentations, &c.

The present case affords a good illustration of all the symptoms characterizing the disease and accompanying the treatment adopted for its relief. The latter must be met and combated as I have described, taking care that the bladder is regularly relieved, and the rectum likewise assisted after the lapse of the first few days, but not earlier; on the sixth day after the operation the patient was able to evacuate the bowels without either pain or risk of laceration. In the course of a fortnight he was nearly well; and the piles which had been left intentionally around the anus were gradually shrinking. The patient was advised to be on his guard against general or local plethora, and to lose blood, if requisite, from the arm or the anus, as the symptoms might indicate.

Case II.—*Hemorrhage dependent on internal piles, relieved by operation.*—About fifteen years ago, a very rich banker, about 45 years of age and of bilious temperament, consulted me on account of piles, which were the source of constantly recurring attacks of hemorrhage. He was much reduced and anematous from this repeated drain, and was unable to attend to his business, for the slightest effort exhausted him. I examined the rectum, and discovered an internal hemorrhoid, which I proposed to excise. The operation was gladly acceded to, and I proceeded in the following way.

Having washed out the bowel with an injection, and removed the patient from a hip-bath to the side of his bed, the nates were separated, and he was directed to strain so as to force down the tumour. This was effected, and with some difficulty the hemorrhoid was excised with the curved scissors. There was no bleeding externally after the operation. I did not, however, leave this gentleman; and in the course of a quarter of an hour I observed all the signs of alarming hemorrhage, as detailed in the last case, making their appearance. Especially he complained of a sense of internal heat in the abdomen, which kept extending higher and higher. I immediately directed the patient to empty the bowel. This was done, and a large quantity of blood was discharged. I then threw in cold water, but the bleeding still continued. I therefore had recourse to the pig's bladder, which was introduced into the rectum and stuffed with charpie. This was entirely successful, though there was much difficulty in keeping it in its place in consequence of the violent straining which it excited, and by which it was actually expelled several times. Doubtless in this case a fatal result must have speedily ensued if prompt assistance had not been rendered. The patient made a speedy and perfect recovery.

Case III.—*Excision of hemorrhoids, followed by internal hemorrhage.*—The banker, whose case I have just described, had a brother at Berlin, who was suffering much in the same way; and having heard of the cure which had been effected, he wrote to me on the subject. According to the enclosed report of the eminent Berlin surgeon who was in attendance on the case, I had not any doubt of the similarity of the two cases, and advised the removal of the internal pile. But, warned by the danger incurred in my own case by the serious internal bleeding, I suggested that the part should be cauterized after the excision was effected, should hemorrhage occur.

The Berlin surgeon paid no attention to this advice. Immediately after the operation he left his patient, and soon afterwards symptoms of internal hemorrhage became apparent. A younger brother, who had witnessed the first operation, recognized these indications, and ascribed them to the right cause. The surgeon was sought in vain, and the danger appeared imminent, when the young man had the presence of mind to follow the example I had set him, by procuring and introducing a bladder into the rectum, which he stuffed with charpie; and in this way the bleeding was arrested. But the loss of blood had been considerable, and it was a long time before the patient's health was re-established.

The next case I shall narrate is interesting for several reasons. The hereditary nature of the disease was exhibited in a very striking manner, as it had affected three generations successively. The form in which the hemorrhoids presented themselves was also very singular; like the catamenial discharge, the bleeding recurred at monthly intervals, lasting for three or four days, and ushered in by precursory symptoms. As soon as the discharge commenced, there was remittance of the pain in the head, with which the patient had been afflicted for several years. The efforts at defecation caused prolapsus of the rectum, which is a not infrequent complication of the disease. The mode in which the patient returned the piles is characteristic; and the cure, which was accomplished after twenty-five years of suffering, is a point well worthy of remark.

Case IV.—*Excision of large hemorrhoidal tumours of twenty-five years' standing.*—G. P. Chalot, aged 45, a broker, presented himself at the Hôtel-Dieu, with hemorrhoids, from which disease his grandfather and brother had also suffered, and his son began to complain of the same. Of a lymphatic temperament and rather feeble constitution, he had nevertheless enjoyed pretty good health until he was about five and twenty, with the exception of violent headache, which was also hereditary in his family.

At the above age he began to experience heat and smarting about the anus, and soon afterwards he perceived several small piles. For two years they remained nearly stationary, and gave him very little inconvenience. During the third and fourth years they grew rapidly, which he ascribed to hard work and irregular living. A gonorrhœa which he contracted at that time appeared also to aggravate the symptoms; and he began to lose blood: then his headache, from which he had suffered from infancy, ceased.

The tumours gradually increased, together with the symptoms to which they gave rise. The bleeding, which was at first irregular in its return, afterwards assumed a strictly periodical type, recurring every month, and lasting for two or three days; these attacks were always preceded by general uneasiness and painful swelling of the hemorrhoids. He married; but the more regular life he then led was not attended by any amelioration in his symptoms. When his sufferings were extreme, he took baths and applied leeches, which afforded him some relief. For a twelvemonth the hemorrhoids did not descend, and then he was afflicted with a painful affection of the nose, which lasted several months, and which was so distressing to him that he regretted the confinement of the piles within the bowel, to which he attributed this new symptom.

After a time, however, the hemorrhoidal tumours again made their appearance, even larger and more painful than before. Every time he had a motion, which always caused him violent straining, the diseased parts descended in a mass, dragging with them a part of the mucous membrane of the rectum; and then the contraction of the sphincter produced strangulation, and entailed excessive suffering. When he was walking they came down every quarter of an hour, and he had recourse to the following expedient to procure relief. He would select a narrow post, on which he placed his handkerchief tightly rolled up, and then, sitting down on it, he would press his nates firmly together, and moving about in this position, would thus contrive to force the piles up. This manœuvre would afford him temporary relief, and he was enabled to continue his walk until obliged, by a renewal of his suffering, again to have recourse to the same expedient.

When he had been to the water-closet, he was unable to retain the tumour for some time; therefore, he always deferred this act, when practicable, till the evening: for, if obliged unfortunately to evacuate the bowels in the morning, he was unable to leave the house for the rest of the day. In the meanwhile, the irritated hemorrhoids grew apace, and at last became irreducible, presenting, around the anus and within the bowel, an irregular and hardened mass about two inches in diameter, and discharging, from numerous ulcerated points, a sero-purulent and sanguineous fluid. The patient became daily more feeble, and even rejected food, that he might have the less to pass off by the bowel.

Such was the deplorable condition of this man when he applied to me; and it was evident that he could not long survive unless something were done for his relief. Indeed, the tumours would soon assume a cancerous character, if such were not already the case. As he was satisfied how nugatory all palliatives had proved, he readily assented to an operation for their removal.

The patient was prepared, as in the preceding cases, and placed in a favorable position to allow of excision. This was effected with the curved scissors; but, as the mass was large and very vascular, I removed it at four different cuts, applying the actual cautery after each.

For the first four-and-twenty hours he suffered but little, and lost no blood. He then had difficulty in passing his water, and required the catheter. On the fourth day, the constitutional excitement was allayed. On the fifth, he had a painful motion, streaked with blood. On the eighth day, the urine was passed without assistance. On the ninth, the sloughs began to separate, and the circumference of the anus was red and very tender; soothing applications relieved this.

When the sloughs had separated, a large and continuous granulating surface was exposed, which made me anxious lest the contraction at the orifice of the bowel should exceed what I desired. To counteract this tendency, I introduced a plug covered with ointment, and gradually increased its size. The wounds healed slowly, and were quite closed at the end of a month. He ultimately recovered his health, and resumed his usual occupations. I advised him to lose some blood, that he might not suffer from the suppression of the discharge to which he had been so long habituated.

Case V.—*Internal hemorrhoids, treated by excision.* Mr. Ex——, a Scotch cavalry officer in the British service, aged 40, and of sanguine temperament, had suffered severely for three years from internal piles, which descended on the slightest attempt to evacuate the bowels. He was operated on, as in the preceding cases; three tumours of small size being successively removed. As the bleeding was very trifling, I did not think it necessary to employ the cautery. An assistant was left to watch the patient.

Five days elapsed before anything attracted attention, and then unequivocal signs of internal hemorrhage declared themselves, such as I have noticed in a previous case. The extreme tenesmus led to an effort to empty the rectum, and a large quantity of blood was evacuated. A cold enema was then administered, and, when returned, it was followed by another. Temporary relief was obtained; but, after the lapse of an hour, the symptoms returned with more intensity than at first. The cautery was then resorted to, and applied with the aid of an open speculum; the bleeding spot being detected by these means, and the curved point of the heated iron applied to it. There was no more hemorrhage; the local irritation consequent on the operation speedily subsided, and the patient was quite well in a few days.

Case VI.—*Internal and external hemorrhoids treated by excision.* A man of low stature and sanguine temperament, about 47 years of age, was admitted into the Hôtel-Dieu with hemorrhoids, which he had suffered from for fifteen years. The pain he endured was so great, that he was able to exert himself very little; and the internal piles readily descended, and, being fretted by his dress, the excoriated surface bled and discharged sero-purulent matter. The act of defecation was torture to him.

This patient was carefully prepared for the operation by being bled and having a blister applied to his arm, to obviate the ill effects attending the sudden suppression of an habitual discharge; the rectum was also cleared out by a purgative.

The piles were both internal and external, and each consisted of seven or eight subdivisions or tubercular masses; the external being dark in colour, the internal of a bright, rosy hue. These were each dissected out, and immediately afterwards the cautery, at a white heat, was applied to the bleeding points.

A small plug was introduced into the rectum, but could not be borne. On the following day there was much febrile excitement, and severe colic accompanied the swelling and pain around the anus; there was also retention of urine. He was bled from the arm.

Gradually, these symptoms subsided; and, the bowels not having acted, on the seventh day an ounce of castor-oil was administered. This acted very freely and afforded great relief, though the act of defecation was very painful. On the twelfth day the colic again increased, and was followed by purging. This lasted for two days, without any assignable cause, and then left him. After this he speedily recovered, and was dismissed quite well.

Of the various risks entailed by excision of hemorrhoids, I have pointed out that hemorrhage is the most frequent and serious. Independently of the characters common to all internal hemorrhage, that from the rectum presents peculiarities by which it may be distinguished from all others. Four or five hours usually elapse after the operation before the symptoms declare themselves. The patient becomes agitated and restless; he is sometimes conscious of a sensation of heat, extending upwards along the bowels; or perhaps he has colic; but there is also a painful sort of tenesmus present. The belly becomes sensitive, especially in the left lumbar and iliac regions. The respiration is hurried and difficult. The pulse, at first intermittent or irregular, becomes small and frequent. The surface becomes pale, and the face is bathed in cold perspiration. The restlessness of the patient is soon succeeded by feelings and expressions of despair; and very often nausea or vomiting, with vertigo and convulsions, supervene. If the intestine is relieved of its contents, a sense of general ease is the immediate consequence, and the most marked remaining symptom is that of extreme prostration. This is the moment the surgeon should avail himself of to arrest the bleeding, or the symptoms will reappear speedily, and more alarmingly than before. The depression which then ensues is such that the patient almost covets death to relieve him; and it requires great presence of mind and firmness in the operator to insist upon and employ the appropriate remedies. These are either compression or the actual cautery.

J. L. Petit employed a double plug, and with good effect. In excising internal hemorrhoids, when the tumours were forcibly extruded, he introduced, by the anus, his first plug; and then, after he had cut away the piles, he inserted the second plug, fixing them together and making all secure by a bandage. By this arrangement, he considered his patient safe against hemorrhage.

Desault and Boyer have since simplified and improved upon this mode of treatment; but it is obnoxious to these two objections. In the first place, the anus being plugged, internal bleeding may go on without being detected; and further, it is necessary to remove the apparatus to allow of the evacuation of the bowel. But, it may be remarked that all methods of applying compression, by plugging the bowel or otherwise, are obnoxious to the objection that the part acted upon is yielding and distensible to an almost indefinite extent; as proved in some instances by the immense accumulation of fæces which the rectum will contain. The actual cautery is, therefore, the most secure and trustworthy method of arresting hemorrhage in such cases.

Again, it may be observed, the risk of hemorrhage is by no means necessarily proportioned to the size of the tumours removed; nor must the surgeon presume upon the absence of bleeding at the time of excision, as an indication of security; for, spasmodic retraction of the bowel may close the vessels for a period, and several hours may elapse before the symptoms of loss of blood manifest themselves. A watchful superintendence of an operation of this nature ought, therefore, never to be neglected.

Bleeding after excision of external piles is readily manageable, from the accessibility of the affected part. But, when internal piles are the seat of operation, it may be necessary to make use of a speculum, the blades of which open widely, whereby to discover and cauterize the source of hemorrhage. If very deeply placed, I think the best course is, under any circumstances, to employ the cautery immediately after the excision is performed.

One of the inconveniences consequent on excision of hemorrhoids is, possible constriction at the anus. In a case of this sort Boyer was obliged to extend the outlet by incisions right and left. A bougie or plug of suitable size, worn in the rectum during the healing process, will suffice to obviate this troublesome consequence, should there be a tendency to it.

I would remind the practitioner of another important point, which should be borne in mind in deciding on the operation of excision; viz.—that prolapse of the rectum is sometimes associated with hemorrhoids; as the removal of the latter will often suffice to cure the former.

I will close this division of my subject by the narration of one more case.

CASE VII.—*Excision of hemorrhoids of long standing; cure.*—P. J. Pasquier, aged 47, a market-porter, was admitted into the Hôtel-Dieu, in 1825, to be treated for piles from which he had suffered for many years, and which had become external fifteen years previously. The descent of these tumours had been caused by the efforts to evacuate the bowels; they had been returned by pressure, but had continually re-appeared during the act of defecation, and had become a source of constant suffering and inconvenience to the patient. The irritation occasioned by walking, the friction of his clothes, &c., caused the discharge of a varying quantity of bloody mucus or of blood. In such cases I have found leeches and anodynes relieve the suffering; but astringents are almost always mischievous. I may remark that, sometimes, hemorrhoids shrink in old age: but, as I have already observed, excision is the best remedy: care being taken to supply the place of the habitual drain which they entail, by the employment of leeches, or the general abstraction of blood in small quantities.

In the present instance the hemorrhoidal tumours surrounded the verge of the anus, consisting partly of internal, and in part of external, piles. The whole mass was excised, as in the former cases, with curved scissors, the diseased part being firmly held with a pair of forceps. At the moment of excision a small quantity of blood escaped,—not from the open mouths of vessels, but from a sac in connection with one of the veins, which contained some clots. It would appear that these cavities are sometimes dilated veins, but at others they appear to be accidental, when the piles are lacerated. When carefully examined, they are found to contain distended veins filled with coagulated blood, and present spaces lined with a membrane analogous to that of veins; they communicate with these vessels by orifices of varying diameter.

In this case there was no bleeding. A little swelling and inflammation followed the operation; and in a fortnight the patient left the hospital quite well.

SECTION II.

ON PROLAPSE OF THE RECTUM.

Surgical diseases so generally entail the shedding of blood and suffering in their treatment, that an important step is taken when any operation is simplified. Some years back, M. Boyer demonstrated that fissures of the anus may be cured by incisions. But prolapse of the mucous membrane of the rectum—a very troublesome if not a serious affection—has been treated hitherto in a most inefficient manner; in fact, all that has been done may be regarded as simply palliative. I have succeeded in completely curing this complaint by an operation, which is simple and easy of execution and certain in its results. This complaint is more common in infancy and old age than in middle life, and consists in a descent and eversion of the bowel, the upper part becoming invaginated in the lower, down to the level of the anus; this extrusion of the bowel varies from two to even six inches. In general this prolapse occurs every time the bowels are evacuated; and in some persons the erect posture, maintained for any length of time, induces it. This tendency often co-exists with hemorrhoids, and is usually met with in persons of feeble constitution and lax tissue.

A simple and natural mode of proceeding in these cases is, to return the bowel whenever it descends; and this is, in general, easily accomplished. But occasionally the swelling is so great, and the spasm of the sphincter so firm, that the extruded part becomes strangulated, and great difficulty is experienced in restoring it to its normal position. In fact, the symptoms become so urgent, that gangrene may supervene if there be not speedy and effectual relief. The best method of reducing the strangulated part is, to place the patient on his belly, and to raise the pelvis with a couple of pillows. The whole surface of the exposed bowel is then to be surrounded by damp cloths, and a compress placed on the centre of the protruding part; pressure is then to be made on the base of the prolapsed portion, and by gentle manipulation the reduction must be effected. In this way the bowel is returned, by commencing with that part which was last forced down. Scarifications have been recommended by some practitioners; but they should be avoided if possible, as they give rise to inflammation, and leave wounds which are troublesome to heal. This remark applies also to the employment of leeches; indeed, I have known hemorrhage and ulceration of the intestine follow their application. At best, this proceeding can be regarded as only palliative; for the disposition to prolapse is not thereby relieved.

Cold lotions and bathing have been recommended; and they are useful sometimes, but require time and perseverance; and, moreover, they give rise to such disagreeable sensations, that many patients will not continue their use long enough to be of any service. Astringents, and pressure made with a sponge, and maintained by a T bandage, are serviceable in children; and so are various suppositories: but these remedies usually fail in adults and old persons. Failing other remedies, it has been proposed to excise a portion of the protruding bowel and of piles which may present themselves on its surface. But this operation of excision, which has been lauded by many practitioners, and amongst them Sabatier, is attended by risks, and especially that of hemorrhage, which may be serious, and has been, in some instances, even fatal. But should this danger be averted by the use of the actual cautery, then a fresh source of trouble is entailed, in the violent inflammation which may follow, involving the intestine, and even the neck of the bladder in its mischievous effects.[1]

Before describing the plan I have adopted in the treatment of these cases, I will say a few words on the anatomical arrangement of the parts around the lower part of the rectum.

The skin covering the circumference of the anus is thinner

[[1] It can scarcely fail to strike the reader that there is an inconsistency between these remarks and the tone of those which accompany the cases in the preceding section. The risk of hemorrhage in extensive excision of internal piles, and that involved in the use of the cactual autery to the bleeding surface, are probably more correctly glanced at here than in the last section. Few surgeons would draw a parallel so unfavorable to the ligature, as Dupuytren.—T.]

and of a different colour from that in other parts. It is rich in mucous follicles, which secrete an oily matter with a peculiar odour. This skin is arranged in folds, with intervening furrows, which converge towards the anal aperture and are lost in it, their number, prominence, and depth corresponding to the degree of contraction of the sphincter muscle; these folds disappear or are effaced when the anus is dilated, and are thus subservient to the mechanism of defecation. Beneath the integument is a layer of fibro-cellular matter, and likewise the sphincter muscles, external and internal.

My operation is performed in the following way: the patient is placed on his belly, with the head and chest low, whilst the pelvis is well raised by pillows, and the thighs are widely separated so as to bring into view the parts to be operated on. The operator then seizes, with a pair of large dissecting forceps, the radiating folds, and excises them with scissors curved on the flat. Two, three, or more of these folds or plaits are thus removed on either side, in front and behind, the excision being prolonged quite to the margin of the anus, or even within it if the relaxation is considerable,—the extent of excision, in fact, bearing a relation to the laxity of the surrounding skin.

Ordinarily the operation occasions but little suffering, and is almost unattended by hemorrhage; though there may be some bleeding if the excision is carried deeply.

The object of this operation is very simple. There is an abnormal or excessive dilatability about the anus. By the removal of the superabundant tissues, this condition is corrected, and the parts within are thus shut in and prevented from becoming prolapsed, partly by curtailing the redundance in question, and in part by the contraction of the neighbouring tissues, resulting from inflammation and the cicatrization of the wounds; the new integument being much more firm, close, and adherent to the deeper textures.

No dressing is needed. The pain occasions immediately a strong contraction of the sphincters, to which and the neighbouring areolar tissue the inflammation speedily extends. Usually the bowels do not act for the first few days; the inflammation subsides, but the sphincters still contract on the slightest effort. In a short time the wounds heal, the aperture is permanently diminished, and the cure is complete. For several years I have been in the habit of performing this operation, and with uniform success, except in one instance, where the patient, a child, interfered, by his resistance and cries, with the completion of the requisite steps to ensure a cure. A somewhat similar operation has been performed by Hey (described in his "Practical Observations"); but here the patient was the subject likewise of hemorrhoids, and the mode of proceeding differed, in many essential particulars, from that which I have described;—the peculiarity of mine consisting in the remedy being applied to the cure of prolapse, uncomplicated with piles.

Case I.—*Prolapse of the rectum; operation and cure.*—G. Brioude, a child of three years of age, was brought home from nursing when twenty-one months old. The mother soon perceived that, whenever the infant had a motion, the bowel came down, and formed a bulging swelling around the anus. When the nurse was interrogated as to how long this state had existed, she pretended to know nothing about it, and that she had never perceived it whilst the child was under her care. The bowel did not entirely return spontaneously; but, at this time, a very slight effort sufficed to replace it. The prolapse became, however, more intractable afterwards, and then the child was brought to the hospital.

The little patient was well-formed and healthy; but every time that he went to stool, or coughed rather violently, or otherwise exerted himself, the bowel descended, and formed a livid tumour between the nates of the size of a pullet's egg. The protruding mucous surface poured out a viscid secretion slightly tinged with blood. The bowel was easily reducible, but could not be kept in its place. As the child was in good health, I did not hesitate to operate at once.

The little patient was placed on a bed, and the nates were well separated. I then reduced the prolapsus, and seizing a portion of the integument around the anus, I excised it with scissors, in the way described above. This operation was repeated four times, and in this way a segment of skin was removed in front, behind, and on either side of the anus, the excision extending even to the mucous membrane of the rectum. There was very little pain felt, and no bleeding. A light dressing was applied, to prevent the descent of the bowel; and the child was taken back to bed, where he was as cheerful as usual. He slept well; and on the following day a solid motion passed from the bowels, without prolapse occurring. On the third day there were two motions, and still the rectum retained its position. Very little inflammation ensued; indeed, so little, that the child did not complain of pain when the bowels acted. In the course of a week he was dismissed well.

A fortnight afterwards I saw this little patient again; and though he had been suffering from diarrhœa for several days, still there was no prolapse of the bowel.

Case II.—*Prolapse of the rectum; operation and cure. Prolapse of the womb.*—Auger, a water-carrier, aged 58, was admitted into the hospital, February, 1833. She had been regular, and the catamenia abundant, up to the age of 50. She had never been pregnant; but appeared to have been the subject of attacks of chronic gastro-intestinal inflammation, and several times had suffered from diarrhœa, which continued even for many months. Eight years ago she was in the hospital for one of these attacks, and then perceived, for the first time, that the rectum came down whenever the bowels were evacuated, but returned very soon and spontaneously. Gradually the extent of the prolapse increased, and at the same time the difficulty of returning the bowel was augmented. When cured of the diarrhœa, she was transferred to a surgical ward, and there had some folds of integument removed from the circumference of the anus, and left the hospital well.

For eight months the intestine retained its normal position, and did not come down even when the patient went to stool, or used any violent exertion; but after that time she again began to be troubled, the prolapse occurring about every fortnight, and being difficult to reduce. She was then (February, 1833) again admitted into the Hôtel-Dieu, and came under my notice for the first time. She was a short, spare woman, of sanguineous temperament. Between the nates was a rounded tumour, the size of a pullet's egg, and of blood-red colour, shining at its lower part, and presenting a cleft, directed from before backwards, in its centre. A muco-sanious secretion exuded from its surface. The finger could not penetrate into the bowel, being arrested by the cul-de-sac. The patient told me that, for seventeen days the bowel had been down without her being able to reduce it; nevertheless, she had motions, there was very little tension of the tumour, and it was not strangulated. There was neither fever nor vomiting; and I found very little difficulty in reducing the prolapsed intestine.

Under these circumstances I did not hesitate to recommend a repetition of the operation, which had failed on the previous occasion, probably, in consequence of the excision having been insufficiently performed. Four folds were, accordingly, removed, as in the last case; the excision extending quite to the mucous membrane of the rectum. For two days nothing occurred calling for remark. On the third day the bowels acted with scarcely any pain, and without prolapse. In a fortnight the wounds had healed, and the cure was complete. For the prolapsed womb a pessary was recommended.

When prolapsus recti is complicated with hemorrhoids, excision of the latter is sometimes sufficient to cure both affections; but if it fail, then recourse must be had to the further operation of removing a portion of the surrounding integument.

Case III.—*Prolapse of the rectum accompanied by hemorrhoids, and cured by their excision.*—F. Chatrane, aged 23, mathematical-instrument maker, of lymphatic temperament, had been the subject of hemorrhoids around the anus for eighteen months, which, as they increased in size, became painful, and bled at each action of the bowels. Soon after the first appearance of the piles, the patient perceived that the rectum became prolapsed; at first it returned spontaneously, but afterwards he was obliged to employ pressure with the hand to complete the reduction. He had also suffered from habitual diarrhœa.

There were five or six hemorrhoidal swellings within the anus, forming a tumour which narrowed the outlet, and forced out the mucous membrane whenever the patient had a motion; the portion which became prolapsed represented a cylinder about four inches long, girt above by the sphincter, and surrounded by the hemorrhoids. The aperture of the intestine was at its lowest part, and the mucous surface was red.

I had it in contemplation to excise some portions of the mucous membrane of the protruding bowel, in the hope that by the adhesion of the contiguous textures, an obstacle would be opposed to the descent. But, on tracing back the disease to its probable origin, I thought it better first to remove the piles, reserving the ulterior step of excision, in case of failure in the first operation. This simple expedient was entirely successful. The portions of excised hemorrhoids contained clots of blood; the wounds soon healed; the diarrhœa ceased, and the bowel never once came down after the operation was performed.

I may here remark that, when I first performed the operation for prolapsus of which I have given instances, I used at the same time to remove more or less of the mucous membrane of the rectum. But this plan I afterwards abandoned on account of the consequences, which were sometimes troublesome. Hemorrhage is very rare; but should it occur, I prefer the use of the actual cautery to plugging, for reasons already mentioned. Usually no dressing is required to the wound, which heals in less than a fortnight.

SECTION III.

ON FISSURE OF THE ANUS.

The diseases which affect the anus and surrounding parts demand the careful attention of the practitioner, both on account of their frequency, and the serious consequences which may result from an error in diagnosis. Fissure of the anus is not a dangerous complaint, but it is one accompanied, in general, by such severe suffering, that it is of great importance to afford as speedy relief as possible. The pain is characterised by this peculiarity, that it increases gradually and lasts a long time after defecation, and is either of a sharp cutting or burning character, and so acute that the patients are at a loss to find words sufficiently expressive to depict their suffering. Usually they compare the pain to that which would be produced by the introduction of red-hot iron into the rectum; and so much is the passage of the fæces dreaded, that they defer as long as possible the action of the bowels, and even deprive themselves of food, in order to escape it.

These characteristics are peculiar to the disease in question; and I may observe that, in studying diseases of the rectum, a careful observation of the various kinds of pain in different affections of the bowel will be found very valuable in determining their nature.

Fissure consists of a longitudinal and superficial ulceration in the mucous membrane of the rectum near to the anus. On separating the borders of this orifice, and directing the patient to strain, a narrow cleft or fissure is brought into view, red at the bottom, and with slightly swollen and callous edges. But in order to ascertain the exact height to which it extends, it is often requisite to introduce the finger into the rectum. It is more often found at the posterior or lateral part of the bowel than in front—a circumstance which is favorable for an operation, especially in women, in whom the anus and posterior commissure of the vulva are separated often by only a narrow partition. This form of ulceration rarely involves the entire thickness of the gut.

The gravity of this affection depends, therefore, principally on the painful spasm of the sphincters of the anus, the fissure being merely accidental; and this is shown by the existence of painful stricture without any fissure; which latter, according to some eminent surgeons, does not occur in one case out of four. This spasmodic condition is such, that the introduction of the smallest body is unbearable, even the end of the finger, or a clyster-pipe producing extreme pain; and resistance of the anus to such invasion is another characteristic of the affection.

This fissure, connected with painful spasm of the sphincters of the anus, had been observed only in the anal region, until M. Pinel Grandchamp remarked a similar condition of the vulva, where the constriction was so firm that the marriage rights could not be fulfilled. Feeling convinced of the analogy of this case with stricture of the anus, Grandchamp made a deep incision, dividing the commissure, the mucous membrane, and the sphincter of the vulva, to the extent of two inches; the contraction was cured, and the parts resumed their normal condition.

There are many causes producing anal fissures; such are constipation and the consequent spasm; the evacuation of hard fæces, which abrades the mucous membrane, and distends the parts in an unnatural degree; the awkward administration of injections, especially when pointed or rough metal pipes are used. They also occur in persons affected with hemorrhoids; the venereal virus, either deposited immediately on the verge of the anus, in an unnatural connexion, or flowing from the genital organs in women, as very often occurs, is frequently productive of this affection.

The well-known insufficiency of almost every local application in this most painful disease, has led to the abandonment of nearly all the means which have been considered either as curative or palliative; and now it is usual to resort to an operation, which is free from danger, it is true, as well as always successful, but at the same time is so exquisitely painful, that patients are unwilling to undergo it; I allude to incision of the sphincter ani at one or more points of its circumferenc may be required by the amount of contraction; or cauterizing the fissure with nitrate of silver in solution. The latter was first recommended by M. Béclard, and I have used it with success in some cases. The operation by incision is so simple, and so well known, that it is unnecessary to describe it.

The discovery of some therapeutic means of cure would be a real service to humanity; and, although the following has not been invariably successful, it has been sufficiently so to warrant its trial before proceeding to an operation.

The spasmodic constriction of the sphincter is the true source of mischief, the prolonged ulceration or fissure is but a secondary condition; for, in curing the stricture, the disease is stopped. Under these circumstances, the application of belladonna would appear to be a natural resource, and I have used it with considerable advantage combined with acetate of lead, in the proportion of one part of each to six of lard.

A small pledget covered with this ointment is first used, and the size of it is gradually increased till it attains that of the forefinger.

The continued use of this ointment for several days, will often completely remove all pain. The following case is one of many that I could cite.

Case I.—*Superficial fissure of the anus; application of belladonna ointment; recovery.*—A strong young woman, of good constitution, confined four months previously, experienced great pain at the anus for several weeks. It was very severe when she went to stool, especially when the evacuated matter was hard. At first this pain lasted only a few minutes, but this period increased at last to some hours.

At the time of her entering the Hôtel-Dieu, (December, 1828), the anus was carefully examined, and, on drawing out the intestine slightly, a very superficial fissure was perceived. There was considerable constriction at the anus, so that the little finger could scarcely be introduced, and even that not without great pain. The nature of the affection being clear, and being desirous of saving the patient from a painful operation, I ordered the above-mentioned ointment to be applied. Pledgets of lint covered with a thick layer of it were introduced into the anus, and renewed several times during the day, and this immediately eased the pain. The patient recovered completely in a fortnight, without the necessity for any operation.

This case clearly shows the propriety of not being over hasty in operating or in the application of cautery, before trying belladonna.

Even if it should not succeed in curing all fissures, it ought nevertheless to be applied, for it will at least assuage the pain, and the ulterior measures can but be resorted to at last.

Before proceeding to the latter, I will first say a few words on the difference of fissures arising from their position. Those which are formed *below* the sphincter ani, affecting only the cutaneous tissue, and not the anal mucous membrane, give rise, in a greater or less degree, to pruritus, but they are of little inconvenience in defecation, they occasion no constriction of the sphincter, and consequently give but little pain. They are commonly due to venereal disease. Fissures *above* the sphincter affect the mucous membrane; they are visible only with the assistance of the speculum. On introducing the finger into the rectum, a hard, knotty cord is felt, the pressure of which gives intense pain. When the patient goes to stool, there is a sensation of distressing tenesmus, which, however, subsides immediately after evacuation. The fæcal matter is covered with puriform mucus, and with blood on the side of the lesion. These fissures are usually produced by the ulceration of internal hemorrhoids during the passage of hard fecal matter. Finally, fissures *opposite* to the sphincter itself are far more serious; and it is in these that we meet with the painful constriction of this muscle, and the other symptoms already described.

Fissures of the first and second class are often cured without any operation; some with simple cerate or cerate with opium, mercurial preparations, &c., others by emollient and narcotic lotions made with decoctions of marshmallow, of poppy-heads, henbane, belladonna, or datura stramonium, and by other means. In this way I cured a cardinal of this affection by injections, and another by the simple use of pledgets.

But in very painful fissures, accompanied by spasmodic contraction of the anus, and which have their seat on a level with the sphincter muscle, the quickest and surest remedy is the operation introduced by Professor Boyer, which is performed with a common or a blunt pointed bistoury. This eminent practitioner proposed a broad, deep incision, for which I have substituted a simple incision of the bottom of the fissure comprising the thickness of the mucous membrane, the sub-mucous cellular tissue, and the skin at the margin of the anus to the extent of two or three lines. This is more simple, shorter, and, above all, less painful.

Case II.—*Very painful fissure, with spasmodic constriction of the anus. Incision. Recovery.*—A man, 28 to 30 years of age, had experienced pains at the fundament for four months, which were considerably increased on passing his motions; so that latterly he could scarcely bear the pain, which was greater even after evacuation, and lasted for four or five hours. To such an extent did this proceed that he resisted as much as possible going to stool, which was thus deferred to intervals of three or four days. He had submitted to various treatment, but neither injections, fumigations, emollients, narcotics, nor castor oil had had any beneficial effect, and he came at last to the Hôtel-Dieu.

He had a small excrescence at the anal orifice, and a spasmodic constriction of the opening, with a fissure on the left side. The excrescence was removed at once with the scissors, and an incision was made into the fissure itself. A pledget with cerate was introduced into the rectum between the lips of the wound.

It is important to make the incision in the fissure itself, instead of making it at a distance from it; for by thus freeing the anus from constriction, the pain is immediately relieved, the fissure cicatrizes freely, and recovery is certain. There is one case, however, in which this cannot be done, namely, when the fissure is in front near the urethra in men, and near the vagina in women.

This affection, though in itself simple, may, from long standing, be complicated with local disorders more or less serious, and with such disturbance of the constitution as to place life in peril.

Case III.—*Old standing fissures, with hemorrhoidal excres-*

cences. Incision. Recovery.—Angelique Delahaye, aged 24, of good constitution, having had several children, entered the Hôtel-Dieu, to be treated for several fissures of the anus, with anal excrescences. The mischief began many years previously, and at its commencement produced very little inconvenience, making but slow progress. At the time of her coming to the hospital, the anus was contracted; several fissures existed round it, as well as a mass of excrescences, which, however, were of a simple nature. The evacuations were at long intervals, and accompanied with horrible suffering, which continued for several hours afterwards. The pain was so severe that the patient deprived herself of food, so as to decrease the evacuations. The fæcal matter was generally mixed with a large quantity of blood and mucus.

The patient's constitution was giving way; she was pale, and bloated all over, especially in the face, and frequently had fever. When asked as to the origin of the disease, she said that she had never had any syphilitic affection, and had no idea whence it originated.

After a preparatory treatment of two or three days, I cut away the excrescences, and at the same time incised the fissures. I took hold of each tumour with the dissecting forceps, and removed it with one cut of a pair of curved scissors; then, with a straight blunt-pointed bistoury introduced into the rectum, I made several incisions in various directions, three or four lines deep. A pledget of lint about the size of the finger was put into the anal aperture, to prevent the incisions from uniting. Little blood was lost during the operation.

On the same day a copious evacuation took place, accompanied by a considerable quantity of blood, but without any of the excruciating pain which was experienced previous to the operation. A fresh pledget was immediately afterwards placed in the rectum, and the same treatment was observed daily, and after every evacuation. She became quiet, gained flesh, and twenty-two days after the operation she left the hospital quite well.

CASE IV.—*Fissure of the anus cured by incision of the sphincter.*—Nicole Lambert, aged 22, married, of sanguine temperament, and good constitution, had been ill for eighteen months. At first, without any known cause, she felt slight pain when she went to stool, which lasted only a few minutes, and disappeared spontaneously; but as the affection became worse, so did the pain likewise increase. After the lapse of three months, the pain lasted for half an hour, and when she came to the Hôtel-Dieu, it extended over several hours after every motion. She was habitually constipated, and dreaded going to stool; she had been in the habit of constantly using injections; the fæcal matter was always hard, and often streaked with blood. The patient ate little, so as to avoid frequent evacuations; her sleep was often disturbed, and she had become very thin. A small hemorrhoidal tumour had appeared during the last three months, at the verge of the anus, and internally the outlet presented a fissure which extended forwards and upwards into the rectum. The introduction of the finger was so painful that the patient shrunk from it whenever it approached the part. On the 12th September I removed the small tumour with a pair of curved scissors, and then introduced a bistoury into the rectum, on withdrawing which I cut pretty deeply into the sphincter, comprising in this incision the fissure which was towards the right side of the anus. The operation was a very simple one; a pledget was introduced into the rectum between the lips of the wound, a little lint was placed on the edges, and the whole was supported with a T bandage. The patient was much surprised, on going to stool the first time, to find that she suffered no more pain than if she had nothing the matter with her, and on the following days she felt no pain, either at the time of the evacuation, or afterwards. The pledget was continued; the fissure and the incision healed, the rectum retaining the dimensions given to it by the incision; and the patient left the hospital quite cured, on the 2d October, a week after the wound had completely cicatrized.

SECTION IV.

ON STRICTURE OF THE RECTUM.

Stricture of the rectum is a somewhat common disease, and women are more subject to it than men. This is due to their habitual constipation; and sometimes also to unnatural cohabitation. On close questioning them, they almost all confess that this was the origin of the mischief. I have many times seen the same contraction in men addicted to this horrible vice. It is easy indeed to conceive that such practice is sufficient to produce simple inflammation, excoriation, laceration, and ulceration, which give rise to thickening and a diminution of the calibre of the intestine. When the poison of syphilis is superadded, the lengthened duration of the affection, especially if it is misunderstood, is a still more certain cause of contraction, which is also occasioned by scirrhous and cancerous diseases.

I shall not dwell upon the symptoms of stricture of the rectum; but I will allude to one of them which has not been noticed by authors. Most persons who are badly affected, have an almost continual diarrhœa, and the fæcal matter comes away involuntarily, and without the knowledge of the patients. It is a true overflowing, as observed in bad stricture of the urinary passage: the cases are quite analogous.

The treatment of this affection offers some peculiarities which are interesting. The dilatation of the rectum by means of bougies introduced into the passage, and within the constriction itself, is without doubt a very good means, since, by gradually increasing their size, prompt and sensible relief is obtained; but, as in cases of contraction of the urethra treated by dilatation, the cure is only temporary, so it is also in contractions of the rectum; as soon as the use of the bougie is discontinued, the affection soon returns.

When the contraction is very considerable, it sometimes happens that bougies cannot be introduced by any means into the stricture; and no force should be used to overcome this obstacle, the only way being to pass the bougie up to the point. It will be seen in this case, as in vital dilatation of the urethra, that the foreign body will in the end penetrate and pass through the contraction. Patients are almost always momentarily relieved by the action of dilating bodies, which made Desault think that dilatation would cure cancer of the rectum. I repeat, these bodies give relief, but they do not effect a cure. The action of compression is to diminish the congestion of the parts, but without removing the disease. By compression, tumours developed in the breast often disappear for a time; but the disease is subsequently re-produced, and proceeds with more activity than before.

When there is a band, it must be divided, as in the following case.

Case.—*Annular contraction of the rectum an inch above the anus. Cure.*—A. S—, aged 35, a servant, was received into the Hôtel-Dieu, on the 5th June, 1824. This patient, who was of sanguine temperament, and tolerable constitution, was operated on six years previously for fistula of the anus; since which he had contracted a gonorrhœa, which had continued for eighteen months. On his second entrance into the hospital, he complained of pains in the belly, colic, and difficulty in passing his fæces, the weight of which towards the bottom of the rectum gave him great uneasiness. His motions came away covered with pus, and in the form of ribands. He denied, as they all do, that this disease originated from a degrading habit; but the way in which he repudiated it almost confirmed the suspicion.

On introducing a finger into the rectum, it was ascertained that about an inch above the anus there was a circular constriction, formed by a sort of imperfect partition pierced in the centre by an aperture, through which the finger could scarcely pass, and not without giving pain. This septum was of trifling thickness, and formed by bands, and was more developed posteriorly and at the sides than anteriorly. On the 11th June, I cut through the circular band in four opposite directions, with a straight blunt-pointed bistoury. A bougie was inserted, but it only remained two hours. He had three motions, occasioned by the presence of blood in the rectum. On the following day he retained the bougie a much longer time; a small quantity of blood came away with the stools. The evening before he had some disposition to vomit; but he soon got better, and I prescribed emollient injections. Suppuration was established, and on the 7th July he quitted the hospital completely cured.

When syphilis is the cause of the contraction, and where congestion and ulceration exist, which do not appear to be of doubtful origin, it might be supposed that the application of mercurial ointment would be appropriate, and that it would wonderfully assist the general anti-syphilitic treatment. This is, however, far from being the case; for mercurial ointment, applied to the mucous membrane of the rectum, produces very active irritation, and very commonly smarting and pain. In these syphilitic diseases of the rectum, mercurial preparations administered internally have a bad effect on the intestine, which they irritate, and they rather retard than accelerate the cure. In such cases I generally resort to mercurial friction, which does not produce these effects. It is easy to ascertain the injurious action of mercury on the rectum when administered internally. When taken either in liquids or pills, it will be partly absorbed in its course along the alimentary canal; it will be mixed with the food and other matter, and accompany them in their course, remaining occasionally a long time in the rectum, until the unabsorbed portion is expelled with the fæces; but during this time the mercury irritates the rectum, and increases the evil which it was intended to cure. These considerations have induced me not to prescribe mercury internally for syphilitic affections of the rectum. The local treatment is the same as in cases of contraction originating from other causes.

PART III.

MISCELLANEOUS.

PART III.

SECTION I.

ON CONGENITAL HARE-LIP, WITH REMARKS ON THE PROPER PERIOD OF OPERATING; AND ON ACCIDENTAL HARE-LIP.

All the vices of conformation, dependent upon arrested development, are met with in the median plane of the body. In some instances several of these fissures are met with in the same individual. In this category may be classed congenital hernia of the cerebrum and cerebellum; fusion of the two eyes, constituting monopsy; fissure of the hard and soft palate; cleft upper and lower lip; separation of the sternum; fissure of the linea alba, open urinary bladder; epispadias; spina-bifida, &c.

To arrive at a proper conception of the manner in which this vice of conformation is produced, it is necessary to call to mind the laws relating to the formation of the embryo. The lateral portions of the body proceed from two primitive points, and the development extends towards the centre; but before these lateral parts, which converge towards each other, come into contact, a third piece, composed of two nuclei, appears between them. This constitutes the inter-maxillary bones of the upper jaw in man and animals, the spinous apophysis for the vertebral column, &c.

If we suppose that the development may have been arrested by any cause whatever, it is especially near those parts where the latest process takes place that a fissure will remain.

For this reason we frequently find, in newly-born infants, openings in the bones of the cranium, the upper lip, the umbilicus, the pubes, the vertebral column, &c.

In hare-lip, when deep, and when the fissure extends to the bones, we find a median tubercle on which teeth are formed. This osseous tubercle is prolonged backwards, as well represented by Kerkringius, Albinus, Sandifort, and more recently by Nicati. Breschet has deposited in the Museum of Pathological Anatomy several sketches of fœtuses and children affected with hare-lip, in which may be seen the median piece and its pedicle. This piece is separated into two, and each forms an inter-maxillary bone.

The existence of these bones, which were previously shown by Galen and Vesalius, and which are so carefully described by Blumenbach in giving their differential characters in animals and in man, is no longer doubted by anatomists.

Nevertheless it was believed that Vesalius and Galen had only described these bones in man, to show an analogy between the human species and animals, especially the monkey tribe. Vicq-d'Azyr had in vain attempted to establish, not only an analogy but an identity of arrangement in the palate and upper jaw of man and animals. People were incredulous; but they were converted by the words of a poet. The discovery of the inter-maxillary bones in man has been attributed to Goethe, who, when he printed his 'Morphology' in 1820, repeated what he had written in 1786. Since that date, most anatomists, and embryologists especially, have spoken of the existence and arrangement of the inter-maxillary bones in man and animals. Thus Spix, Soemmering, Autenrieth, Blumenbach, Senff, Meckel, Beclard, Serres, have confirmed, by new observations, what was already known, but they have not added much to our knowledge. One anatomist, little acquainted with the splendid labours of comparative anatomy of our time, and especially with those on embryology, has recently maintained that the inter-maxillary bones have no existence in man; which is simply an assertion made against all evidence, and remaining a century behindhand.

Hare-lip may be labial or palatine, or both. It may be simple, or on one side only; or double, exhibiting itself on both sides with a median tubercle. When simple it is never in the median line, but a little on one side, generally on the left. I have explained this difference by pointing out the greater precocity of development of parts on the right side than on the left, which accounts for their predominance and preponderance in physiological action.

This precocity must be attributed to the blood from the placenta being distributed in the liver, which lies rather more to the right side than the left: this also accounts for the earlier development of the right side of the vertebral column, and thence for the deviation of the aorta to the left.*

Strictly speaking, it might be affirmed that hare-lip is scarcely ever exactly in the median line of the body, because it does not occur between the two inter-maxillary bones; but the two bones, united, are pushed to one side or the other. It may also be said that the median tubercle, formed by these two bony parts, is not regularly developed, as one of them is most frequently smaller than the other. Hare-lip may also be complicated with a cleft palate, either with or without the development of the septum nasi, or division of the velum palati and the uvula, and even of the vertebral column. This separation towards the base of the cranium is sometimes prolonged to the face, and produces a very singular condition of the nose, fusion of the eyes, separation of the bones of the cranium in the median line, and the division of the brain into two lateral halves. It is known that, in the development of the brain, the commissures are formed during the last period of the evolution of this organ. The whole of these organic deviations appear, therefore, to be in exact harmony with the laws of the formation of the embryo. These considerations are but a rapid analysis of what Breschet has communicated to me.

The operation for hare-lip, which is very simple in most cases, presents, however, two important and hitherto undecided points: first, the most proper period for its performance, and secondly, the treatment applicable to a complication hitherto little noticed.

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* The soundness of this reasoning may be fairly questioned.

The most opposite opinions have been started on the first question. Many surgeons have been of opinion that it is better to wait for the period when children could appreciate the deformity; founding their opinion on the greater thickness of the lips at this period, and on the requisite firmness of the tissue to bear a suture. Many think that it is better not to operate till towards the end of the third year, except in cases where the defect interferes with suckling. The tissues, they say, having become more solid, without having lost any part of their extensibility, are capable of resisting the traction of the pin. Children also are sufficiently reasonable to submit easily to the precautions necessary to insure success.

Others have thought that they might operate on newly-born infants, because the lips, being furnished with blood-vessels of which a portion may in a short time be obliterated, heal more promptly than at a later period. Moreover, such young infants are less subject to agitation, and have not yet acquired the habit of suction. But the operation is by no means certain immediately after birth, because the flesh is too soft, and too easily cut by the pin; and because the general mortality, independently of every special cause, being much greater at this age than at any other, it would be imprudent to increase the chances of death to which infants are subject, by that arising from the operation. These are the disadvantages; let us see what there is to balance them. Doubtless it is important to operate early, that the infant may be able to take the breast; but this predisposition, this habit of sucking, is precisely one of the greatest obstacles to the success of the operation. If this could be avoided, it would be a powerful argument in favour of the operation at birth; but an infant sucks by instinct, even before it is put to the breast; the obstacle is as great then as it would be at a later period.

This is not, however, the least convenient period; and it is difficult to conceive how so many authors have given the preference to the age of 4 or 5, alleging that the child is sufficiently reasonable to see the necessity of the operation, that he would submit to it better, and bear the pain with greater courage. Experience should have undeceived them. At this age children know just enough to foresee, to feel, and to remember pain, without possessing sufficient mind to induce them to bear it; they try to escape from it as much as possible, and do all in their power to impede the operation. At the very best, we may expect some little quiet behaviour from young girls in whom coquetry is predominant, and who begin to like flattery; boys, who are insensible to this, are altogether intractable. I have recently proved this by experience.

At a more advanced period, reason and courage are certainly more developed; but should the bones be separated, their increased density leaves less hope of their union. In every case it is advantageous to operate early; the deformities are less, and those dependent on the separation or deviation of the bones disappear altogether. For these reasons, I think it best to operate at three months; life is then more certain, and the chances of mortality less than at birth; the infant, of course, feels the pain, but forgets it as soon as it is over, and does not in any way impede the success of the operation.

This has always been my practice, and it has invariably been successful. The union of the separated parts has been effected with extraordinary rapidity.

But there is yet one other point in the operation for hare-lip, to which I would direct attention. When there is a projecting median tubercle with two very decided lateral fissures, one must either pare away the osseous portion which sustains it, or endeavour, with greater or less success, to force it into its place. Those authors who have reported cases in both ways, have too much disregarded the deformity which resulted from their treatment to touch on this point; at least, all have passed it by in silence; though it is well worth a little consideration.

If the fleshy tubercle project in front, attention must be paid to the point of its insertion at the septum of the nose; on which frequently depends the degree of projection, as well as the proceeding to be adopted. When this insertion is near to the point of the nose, and we attach the tubercle to the lateral portions of the lip, these latter draw it back; the point of the nose follows the same direction; the alæ then separate, and the whole nose becomes flattened and sunk in, presenting a very unpleasant appearance, more like the muzzle of an animal than anything else. I have more than once had occasion to regret having inflicted one deformity on a child to cure

[illegible]

[illegible] with great care I [illegible] above [illegible] was a small space about the diameter of a pin's head, and the operation was not completely successful.

In cases where the nasal tubercle is inserted near the [illegible], it is proper to preserve it as an integral part of the lip. In such cases I cut away also a portion of the prominent bony tubercle. Malgaigne, in an article published in the 'Gazette Médicale,' expresses an opinion that this method is not always without its disadvantages. The most serious, he says, is the ablation of the dental germs of two, three, or even of the four, incisors. We shall see hereafter that this objection is more specious than real. The operation, however, is not always free from danger, as the following case will show.

Case I.—*Double hare-lip. Excision of the osseous tubercle. Hemorrhage. Death.*—Early in August, 1832, a child was taken into the Hôtel-Dieu, three months old, with a complicated, congenital, double hare-lip. On the right, the fissure extended the whole height of the lip to the roof of the mouth and the velum palati; on the left, the fissure was of less extent. The middle tubercle was inserted rather near to the nasal spine, so that it was thought possible to use it for perfecting the lip. It was separated, therefore from the osseous tubercle, and the latter was cut away with a pair of scissors; it contained the germs of two incisors: the remaining part of the operation was postponed to another day. A small quantity of blood was lost at first, then the hemorrhage appeared to cease; but the efforts of suction renewed it, and it was found necessary to use cautery. The blood which was swallowed came away in part with the stools, and on the day fixed for the completion of the operation the child was too weak, and it was deferred. But the debility only increased, the median piece became gangrenous, and the child soon died. No autopsy was made. A variety of circumstances, amongst which I may note great loss of blood, and the retention of this blood in the digestive canal, may compromise the life of the patient; but I do not hesitate to say that this result is very rare. Blood, when swallowed, is never digested, and is commonly returned by vomiting; but if it remain in the digestive organs, it soon impairs them, becomes a source of irritation, and gives rise to pain and diarrhœa. Purgative injections should be given to encourage its expulsion if necessary. A flow of blood into the mouth leads also to a sucking effort, which becomes habitual in children, and which may even destroy the cicatrix if formed.

In the young child upon whom I operated for this variety of hare-lip, where the middle labial tubercle was isolated from the lip by two lateral fissures, and inserted almost immediately at the end of the nose, my process completely obviated the flattening of the nose, which was well-formed. But you have seen only the result, and you are ignorant as to the extent of the deformity, and the circumstances attending the operation. Another case which I am about to relate will confirm the advantages of this process.

CASE II. *Double congenital hare-lip. Labial tubercle inserted at the end of the nose. Operation; complete cure.*— Louisa Rouzon, aged 14, was admitted into the Hôtel-Dieu, early in October, 1832, affected with a very complicated double and congenital hare-lip. The middle osseous tubercle, consisting of the incisor bones, projected forward more than six lines beyond the superior maxillary bones; it contained four incisors, of which the two middle were very long and directed downwards, inclining forwards at their external edges, so that the junction of the internal edges formed an angle above; in front of the osseous tubercle was a fleshy one, of nearly circular shape, originating immediately from the end of the nose, from which it was only separated by an almost imperceptible notch, and was so directed forward that it seemed to be a continuation of the nose itself. Outside this middle portion, the two apertures of the nostrils communicated by two wide fissures with the aperture of the mouth. At their posterior extremity these two fissures ended in one single division, separating in their whole length the roof of the mouth, the velum palati, and the uvula; so that externally there was a frightful deformity, and internally there was a complete communication between the cavities of the nose and mouth. It was, in fact, a characteristic type of complicated hare-lip, such as I have pointed out; and for the cure of which I had suggested and put in practice a new mode of operation. The operation on this patient was performed on October 5th, as follows:

The patient was placed in front of the operator, with her head thrown back and held against the breast of an assistant. I divided with a bistoury the mucous fold which united the cutaneous to the osseous tubercle; then, with very sharp cutting pliers, I cut off from the latter so much as extended beyond the anterior plane of the maxillary bones. Having finished this first stage of the operation, I pared away, with a pointed bistoury, the lateral edges of the internal tubercle, and afterwards its inferior edge; then, with strong scissors, I did the same to the vertical edges of each lateral portion of the lip. These incisions having been completed, the parts were brought together in the following manner. A pin was passed about half through the lip, about one line from the pared edge on the left side, very near to its free edge, directed obliquely from below upwards and from without inwards, and then obliquely on the opposite side in a contrary direction, that is, from above downwards, and from within outwards. This step, which is not a new one, was intended to form a median projection to the lip. The first pin having been made fast by a bight of thread, the second was placed transversely, about a line and a half higher; the third, which was longer than the others, was to carry out a more complex object. The cutaneous tubercle, bleeding at every part except its root and external surface, was folded back and applied to the osseous septum of the nostrils, so that its external face was below, in order to form a sub-septum to the nostrils. The third pin thus comprised at once the upper extremity of each portion of the lip, and the free end of the folded tubercle; two cross sutures completed the union of each angle of this flap to the labial portions. The three needles were secured by thread twisted round them as usual, and over them were applied strips of plaster. The cheeks and nose were then supported, and several turns of a roller carried around the head and face.

The patient was immediately carried to bed, and put on a spare diet and diluent drinks. The first day or two passed over favorably and almost without pain. On the 8th October slight pain came on, which soon became acute and insupportable. During the night between the 9th and 10th, hemorrhage took place. Being detained at home by illness, nothing was done in my absence; the bleeding stopped of itself, and the pain appeared to be a little diminished, but it returned with hemorrhage on the following night. The next morning I took off the roller, and found nothing wrong in the two halves of the lip; the strapping and the pins were left as they were. But the flap of the sub-septum appeared of a blackish grey colour; the sanies which was discharged and the fetid nauseous odour which exhaled from it were symptoms of approaching gangrene. It was bathed with wine; a half circle was cut in the upper strip of plaster, the edge of which rested rather too much on the base of the flap; and the bandage was re-applied. Four days after, the dressing was again taken off; the flap had assumed a vermilion tint, and cicatrization was going on. On the 26th it was almost complete; but it was apparent that the sub-septum of the nostrils was very broad, and that it would be necessary to lessen it. This was done a few days later, by cutting away a strip from each side with a bistoury and common forceps. Each strip did not exceed a line at the utmost; however, the section fell across a small artery, and gave rise to a slight hemorrhage. A plug was introduced into each nostril, to keep them dilated; and, the last incisions having healed, the operation proved quite successful. The nose, which was previously so deformed, was quite like a natural nose, the end was not at all flat, and in fact was rather handsome than otherwise. The upper lip, notwithstanding the great amount of substance it had lost, was less drawn in than could have been expected; it was only a little pinched up in the middle, and notwithstanding the precautions that were taken to form a projection in the centre, it has resulted instead in a very marked re-entering angle. The lower lip appears a little thick and prominent. The mouth closes tolerably well, and the countenance altogether is tolerable.

It would be difficult to form an idea of a more hideous deformity from hare-lip, than that from which this girl was suffering prior to the operation; without taking into account the discomfort in speaking, mastication and deglutition, from these two fissures terminating behind in one complete fissure.

The object of this first part of the operation was simply to make good the external division; we have now to combat the separation of the maxillary bones by means of a spring support somewhat similar in form to that used in inguinal hernia, with a pad at each end. Should the second part of the operation succeed, then staphyloraphy will be tried. It may be asked if this junction is possible. I answer, yes; for it can be effected in young people by simple muscular pressure. The apparatus is intended to support the two maxillary bones, forcing them by degrees into juxtaposition: it is kept in position, both before and behind, by small straps.

On the 19th December, this young girl was in good health; the re-entering angle of the upper lip had considerably diminished, and only offered a slight irregularity. When asked if any improvement had taken place in the inside of her mouth, she answered that the parts were closer together, especially anteriorly, which she could easily ascertain with her tongue. Now, if the parts are sensibly nearer after a trial of two months, there is every reason to believe that a continuance of the pressure for a few months longer will nearly, if not quite, effect a cure.

The first time this support was used it rested on the lower edge of the affected part, where it soon became too loose. Applied on the cheek bones it gives pain, and children will get rid of it. But it is beneath the cheek bones, on that portion of the maxillary bone which is a little behind, that the pads should be fixed, as there is a fatty cushion in this part, by which pain is avoided; and though the spring may not press so directly here, it is more easily kept in place. It bears partly on the alveolar arch, and partly on some points of the maxillary bone. The idea of this support was first suggested to me by the case of a daughter of the celebrated manufacturer O——, who was suffering from a deformity of this nature. After several fruitless attempts, Charrière and I succeeded in making an apparatus which was most successful.

Three months after the operation, Louisa Rouzon was again brought to the theatre. The parts had become nearer by two lines during this time, as incontestably proved by the measurements and models taken by M. Brun. The girl could feel it herself. The sound of the voice was still nasal, but she performed the motions of suction and prehension perfectly well. The two halves of the roof of the mouth began to touch anteriorly, and there was every promise that the union would be complete. It was ordered that the pressure of the instrument should be assisted by that of the fingers, to be repeated frequently during the day. The girl was desired to come again in six months.

This malformation has been recently explained as an arrest of development, according to which the upper lip was formed primarily of three distinct portions, which unite only at a more advanced period of uterine life. This opinion gained weight from the circumstance that the middle part of the upper maxillary bones, which commonly sustains the middle labial tubercle, has, till adult age, traces of separation from the bone to which it adheres, for which reason it is, by some anatomists, called the inter-maxillary or incisor bone. This was also my conviction; but latterly some trust-worthy observers, who have been specially occupied in studying the bones, have assured me that they never met with the incisor bone, nor with the middle portion of the lip separated from the fleshy or osseous lateral portions during any period of fetal life. I must confess, therefore, that I have now some doubts as to the view I at first adopted from what I had myself seen. In any case, the anatomical details given at the beginning of this subject demand fresh inquiries.

But here physiological ideas are of little importance compared with surgical means, as it was impossible to unite the middle tubercle with the lateral portions of the lip. It may be imagined what effect would have been produced by the upper lip descending immediately from the end of the nose; the lip drawn up, leaving the teeth and the gums uncovered; the nose drawn down, widened, flattened, and more like the muzzle of a calf than anything else. Having rejected this course, it became impossible to preserve the osseous tubercle entire, because only a part of the deformity would have been remedied; it would have been necessary to have cut off the fleshy tubercle, which was too considerable to admit of such a loss; and again, what an obstacle the projection of the bones would have presented to the union! The only reason for the preservation of this osseous tubercle was the existence of the four incisors, which were necessarily destroyed with it. But their vicious arrangement would have made their preservation of small utility; the deformity would have been greater, and this single reason could not outweigh the opposite advantages. However, it was prudent to cut away only so much of this tubercle as extended beyónd the maxillary bones, as that which remained, although inconsiderable, would always be of use in partly filling up the median line of the roof of the mouth.

CASE III.—*Simple hare-lip, accompanied by separation of the bones which form the roof of the mouth, and by a division of the velum palati in its whole extent. Operation. Cure.*—Fliny, 8 years old, entered the hospital on the 28th August, with the following affection: on the left side a congenital division of the upper lip, extending from its free edge to below the corresponding side of the nose. This division was accompanied by a separation of the bones of the palate, and a fissure comprising the whole extent of the velum palati. When the child laughed, the separation of the lip increased, and exposed several teeth. His speech was confused and hollow, and the mucus from the nostrils passed into the mouth through the aperture in the roof.

An attempt had already been made to correct this deformity, but unsuccessfully; and the patient came to the hospital for further advice. On the morning of the 29th he was operated on as follows: I first cut through two small fræna which held the edges of the division close to the gums; I then thrust a bent needle, armed with thread, into the lower angle of the edges of this division. The needle was drawn out, and the thread served to stretch each side of the fissure, so as to admit of their being cut as near as possible to the point of union of the skin with the mucous membrane. This having been done with a pair of sharp scissors, the edges were brought together at an angle towards the sub-septum of the nose. Two needles were passed through the edges of the division, and the wound was united by a twisted suture. Two thick compresses were placed on the cheeks to bring them forwards, and a bandage, rolled at both extremities, was applied over the head, so as to support the compresses, and keep the edges of the hare-lip well together.

The patient was fed for four or five days with a sucking-bottle, and he was kept from anything that might excite him to speak or cry.

On the 3d September the needles were removed, leaving the threads which formed the suture, and the bandage was continued. The union appeared to be exact. On the 5th, strips of plaster were applied to the cicatrix which was still tender, and the bandage as before. On the 14th, the cure was as perfect as possible; the union was exact: but the side of the nose corresponding with the division of the lip was more depressed, more drawn outwards than the other side. An attempt was made to bring it to its place by means of a small pad of lint fixed at its base by strips of plaster, which was partially successful.

The patient remained in the hospital till the end of the month. It was found necessary to take out a projecting tooth, which was irritating the posterior part of the cicatrix. As long as the bandage and the strapping were kept on, the union appeared to be perfect; but by degrees it was seen that a very small and almost imperceptible triangular separation took place at the lower part. This afterwards became less apparent, so that the cure was as perfect as could be wished.

The title of hare-lip is not confined to the vice of conformation, such as we have been considering; but the same is applied to all the accidental divisions of the lips caused by malignant pustule, by wounds from fire-arms, or sharp or blunt instruments, when they have not been united immediately after the accidents which occasioned them. Accidental hare-lip may occur in the lower as well as the upper lip, or in both at the same time; and the division may take place in any direction, whilst the congenital affection never varies.

CASE IV.—*Recent and accidental hare-lip.*—Thiessaut, aged 11, was brought to the hospital on the 17th of February, 1822: he had been bitten in the lower lip by a horse, with which he was playing; the wound was contused, and had bled freely when it was made. Its direction was oblique from above downwards, and from within outwards; the edges were a moderate distance apart. I did not think it necessary to have recourse to a suture, and recommended that the bleeding edges should be united immediately with a strip of adhesive plaster. The wound being brought together, a small pledget dipped in cerate was applied to the centre, then on each side a small piece of linen, kept in place by a strip of plaster, the two extremities of which were near the ears, whilst the centre pressed on the middle of the division. A sling was then applied, the middle embracing the chin and sustaining the lower jaw, so as to prevent any motion, whilst it contributed at the same time to keep in their places the graduated compresses used to bring together the edges of the wound.

The mother of the child was desired to watch attentively, that he did not touch the dressing; and to feed him with slops so that no mastication was required; also to avoid all exciting causes to laughter or sneezing.

The chin-support was changed daily, as the saliva wetted it and made it hard. On the sixth day the dressing was removed; the union was exact, and cicatrization nearly completed; the edges were kept together by adhesive plaster for four days more, when the cure was perfect, leaving only a linear scar.

SECTION II.

ON RANULA AND ITS TREATMENT.

It rarely happens that those tumours called ranula originate near the point of the tongue; they generally occur beneath the base of its free extremity; and it is precisely owing to their choice of this spot that the diagnosis is often obscure, and that other tumours of quite a different character are mistaken for them, as I will presently explain. Tumours resembling ranula are met with inside the mouth, and their development may be explained in the following way.

The skin is provided with a number of follicles which secrete a certain quantity of oily matter, which secretion, though scanty in man, is abundant in woolly animals and birds, especially aquatic birds, the delicacy and beauty of whose plumage is maintained by it, and preserved from being injured by contact with water. It is still more abundant in fishes, the whole surface of the body being lubricated by a viscid glutinous fluid. It is the same with the mucous membranes which line the internal surfaces of our organs. The follicles are innumerable, and are constantly pouring out mucus to lubricate the surfaces. Like every other tissue, they are liable to disease, and then their secretion is sometimes suppressed, sometimes modified in its nature or quantity; at times it becomes very viscid, and again the mucus may be changed into an oily matter. The small orifices of the follicles are frequently closed, and the fluid which they contain accumulates and distends them; they become inflamed and will increase to a considerable size. These tumours are known by their prominence, transparency, indolence, and especially by the glutinous serum which covers them. They are rarely single, but very commonly grouped together in patches, adhering to one another by this secretion. They generally occur inside the cheeks, in front of the gums or beneath the tongue. These tumours, then, are cysts developed in the mucous follicles, or sero-mucous sacs formed in the excretory ducts of the mouth. It is requisite to be accurately informed on these points, that it may be clearly understood what is meant by ranula.

This name (in French, *grenouillette*) is derived from the shape of the tumour, which bears some resemblance to the back of a frog, or from its existence giving a sort of croaking sound to the articulation. It is a swelling resulting from an accumulation of saliva in the excretory ducts of the sub-maxillary glands, and occasionally of the sub-lingual glands; the latter being much less frequent.

The excretory ducts of the sub-maxillary and sub-lingual glands appear to be the only ducts which admit of such a dilatation of their parietes and retention of the saliva. The duct of the parotid gland is formed of tissues too dense and too resisting to permit the development of such a tumour. Therefore, it is admitted that the dilatation is peculiar to the former, whilst fistula occurs more commonly in the latter.

However this may be, it is certain that the actual seat of ranula has not been anatomically demonstrated; and it is yet to be ascertained by pathological anatomy, whether it really is localized in the excretory ducts of the sub-maxillary salivary glands; or whether it consists simply of a cyst formed by a membrane similar to the serous tissues, and containing an aqueous humour; or whether the causes are the same in all cases, as in one now under my care, in which the mucous follicles are the seat of the disease. It is probable, indeed, that tumours of different character, belonging to each of the three series, have been indiscriminately confounded together, and described under the title of ranula, by the many authors, both ancient and modern, who have treated the subject; and that affections have been considered as ranula which bear no analogy whatever to it. Thus Celsus considered it as an abscess of a particular sort, and Ambroise Paré, otherwise such a judicious and good observer, has made the same mistake. Actuarius pretends to have cured it by opening the vein, for which reason Camper said that he considered the disease arose from dilatation of this vessel. Fabricius d'Acquapendente placed ranula amongst encysted tumours. John Munnicks considered that it depended on an accumulation of saliva in the ducts which open under the tongue by a principal canal, of which Wharton, who published his work in 1656, pretended to be the discoverer; but Bérenger de Carpi, who wrote in 1521, had spoken of it most clearly and precisely; nor was it unknown, long previously, to Galen, and other early writers.

According to some authors, ranula specially affects children, who sometimes have it at birth, as shown by cases published in the Commentaries of Leipzig, and in Vogel's work. But they probably confounded ranula, properly so called, with serous, sub-lingual cysts, which are sometimes very large, and descend to the sternum. Breschet, who published in the 'Répertoire d'Anatomie' a complete work on this disease, and discussed all the questions associated with it, with that talent and ability which characterize all his writings, opened five of these pretended ranulæ, and ascertained on examination of the bodies of newly born children, that they were simple serous cysts, unconnected with the thyroid, or with tumours of the same kind developed in the structure of this body. Camper saw two large tumours of this sort in a very young girl; he had also seen ranula on either side of the frænum of the tongue in both men and women, but never in children.

The closing of the external canal of the sub-maxillary gland may proceed from inflammation of the sub-lingual membrane, or of the tissue itself of the tongue; thrush or ulceration near the opening of the canal may give rise to its obliteration. In cutting the frænum, the excretory ducts which open at the sides of this membranous fold are sometimes involved, and they may be obliterated by the cicatrizing of the wound. Calcareous concretions, or small calculi formed in these ducts, may oppose the exit of the saliva, whence may arise the accumulation of this secretion, and the dilatation of the duct whose office it is to discharge it into the mouth. It is difficult in practice to distinguish which of these causes has produced the disease, because it increases quickly, and patients seldom apply to the surgeon till it has advanced considerably.

Although ranula usually contains only saliva more or less thickened and altered, or some humour similar to saliva, a puriform or purulent fluid has been found in the cyst; and also, rather frequently, concretions or calculi. Hippocrates makes mention of small stones under the tongue. In the Ephémérides des Curieux de la Nature, in the 'Commentaires de Leipzig, and in the 'Philosophical Transactions,' there are examples of these concretions of the size of a pea or a bean. Blégny saw one as large as an almond. Forestus has seen two, at least, as large as a hazel nut. J. L. Petit extracted one shaped like an olive, and Lieutard, a surgeon at Arles, removed one in shape and size like a pigeon's egg. Lafaye, in his 'Notes sur Dionis,' says that a surgeon found, in a ranula, at least eight ounces of calcareous matter. And lastly, Louis tell us that Leclerc removed about a pound of sandy substance from a tumour of the same kind, with which a nun was affected.

In general ranula is sufficiently defined for an attentive observer to recognize the disease at once. It is a soft, whitish tumour, regularly rounded or oblong, situated under the tongue; fluctuating, but without pain, redness, or other inflammatory symptoms; yielding a little to the finger, but quickly resuming its original form when the pressure is removed. At first it is scarcely perceptible, but gradually increases in size; it is usually not larger than a walnut or a pigeon's egg; but, in some cases, it has reached the size of a hen's egg.

As it developes itself, the tumour pushes the tongue backwards, displaces or loosens the teeth, alters the voice, impedes the articulation, prevents suction in infants, and mastication or deglutition in others. It depresses or pushes aside all the parts with which it comes in contact; and at length it is apparent externally, showing itself underneath the jaw, and at the anterior part of the neck.

The cause and nature of the disease being once known, it would appear easy to find a cure for it; yet we find that this end is rarely and not easily attained. Puncture of the tumour by the mouth is the plan usually adopted: a narrow bladed bistoury, a lancet, or a trocar, are the instruments selected for the operation. If the humour is limpid, and only slightly viscid or consistent, without concretion, this sort of tapping may procure the evacuation of the fluid in the tumour, and give the patient temporary relief; but the opening closes soon after the operation, the saliva accumulates again, and the tumour reappears. J. L. Petit gives a case in which puncture with a trocar was repeated ten times without curing the disease.

Incision or puncture may be made at the prominent part of the tumour in the mouth, or towards the anterior and upper part of the neck. The latter has not been generally approved of, and many practitioners have considered that an external opening might be followed by permanent fistula. A case, borrowed from Muys, has been cited by almost every writer, to show the impropriety of this method of operating. Nevertheless, the case communicated by Leclerc to the Royal Academy of Surgery, would seem to prove that there is no reason to apprehend a salivary fistula externally. Leclerc made a puncture beneath the chin, and enlarged the opening with a bistoury. A quantity of fluid and sandy substance was discharged from the aperture, and by proper dressings the cure was effected in a short time. But this result itself affords reason for thinking that Leclerc had to do rather with a cyst filled with serum than with a true ranula; for the puncture would have given only temporary relief, and the disease would have re-appeared if its seat had been in the excretory duct of a salivary gland.

The result, in fact, which should be aimed at, is not only to empty the tumour, but to prevent a fresh accumulation of fluid; with which view it is necessary to keep the aperture open. This end is more usually attained by actual cautery than by any other means; but this is not infallible, as I know from experience, and as Sabatier and other eminent surgeons have proved. It is strange, indeed, that the opening of a distended sac, and the constant discharge of a fluid, should not be sufficient to prevent the aperture from closing. It is, however, an established fact; and it would seem to prove that, in the formation and maintenance of a fistula, there is something more needed than the mere discharge of a fluid; since a fistula of Wharton's duct, which would cure the ranula, could not be produced by a simple wound, or even one involving loss of substance, and the continual discharge of a fluid; if so, the return of the swelling after being punctured, would prove the existence of a serous cyst, rather than of ranula, formed by the dilatation of the excretory ducts of a salivary gland.

Sabatier and the celebrated Louis have cured tumours of the kind we are now considering, by cutting away some of the parietes of the sac, and inserting in the opening tents of lint, or pieces of bougie, or of lead wire, which were taken out every day to admit of the discharge of the fluid accumulated in the sac.

All that I have said about puncture, whether left to itself, or whether kept open temporarily by some foreign body, shows that these means are but palliative, and consequently insufficient. The same may be said of incisions, for the extent or direction of the opening are of no importance, as it is well known that a large wound heals in the same manner as a small one, and very often as quickly.

Case I.—*Ranula operated upon by incision.*—Léon, a dyer, aged 15, came to the Hôtel-Dieu, on the 7th February, 1824, with a tumour in his mouth. He was stout, strong, of a sanguine temperament, with short neck, and face habitually red, but otherwise of robust constitution. A month before he came to the Hôtel-Dieu, he was inconvenienced by feeling a large round swelling under his tongue, in the anterior and lower part of the mouth. He went to the hospital of La Pitié, where a surgeon, in doubt as to the character of the disease, ordered only emollient applications and gargles. After remaining there three weeks, the tumour had, according to the patient's account, diminished by one half. He left uncured, and a few days afterwards came to the Hôtel-Dieu.

The disease was immediately ascertained to be ranula: it projected considerably on one side below the lower jaw; and on the other side, beneath the tongue, it formed a double tumour, larger on the right, consistent, rounded, and fluctuating on the left.

On the 9th February, his head being supported by an assistant, and his mouth opened wide, I made an incision with the point of a bistoury, giving vent to a great quantity of greenish-yellow, ropy fluid. The instrument by which I had intended to keep the wound open was not applied, as it required some alteration. I therefore ordered another, to consist of two small spheres, joined at one point, by which the above-mentioned inconvenience was avoided. In the course of the day a rather large quantity of fluid continued to be discharged from the sac of the ranula. This continued on the 10th, when a blunt probe was introduced into the wound, which showed a tendency to close.

On the 11th, without any apparent cause, the patient was seized with pain in the right side, and expectorated a little blood. In the evening he was bled from the arm. On the 12th, the face was flushed, the breathing short and painful; the stitch in the side continued, with bloody expectoration, and a strong and frequent pulse.

He was again bled. On the 13th, the pain and oppression continuing, twenty-five leeches were applied on the painful part. On the 15th there was less pain, but frequent cough and considerable expectoration; and he improved during the succeeding days. A probe was introduced occasionally to prevent the wound from closing. On the 21st, the new instrument not being ready, the opening was enlarged so as to admit one of the plates of the common instrument. This was followed by considerable swelling beneath the chin; and the instrument could not be retained in the opening, on account of its being too large.

Shortly afterwards this patient quitted the hospital of his own accord; the wound being closed, without any further filling of the salivary sac.

Since that time the patient has not been heard of, although he was requested to show himself from time to time.

Excision of a portion of the parietes of the tumour has been proposed and carried into effect, but in many cases this has only postponed the period of relapse, without effecting a cure. The loss of substance retarded the cicatrization, but it was completed at last as in cases of simple incision. Excision should be resorted to when the tumour is of considerable size, and its parietes thick, firm and resisting. There is no danger of any lesion of the nerves or important vessels; and any slight effusion of blood may be easily stopped by astringents. At the commencement of ranula, it has often been cured by cutting away a portion of the sac, and cauterizing it internally. Some time ago I was called to see a young lady, who had suffered a short time from ranula. I cut away a portion of the cyst with a pair of curved scissors, and touched the interior with a pencil of nitrate of silver. Active inflammation of the sac ensued, and there has never since been any fresh accumulation of fluid.

The same cannot be said of *extirpation*. It has been talked of, but never practised; the fear of involving the nerves or large blood vessels has prevented surgeons from attempting it. If the tumour only were removed, the operation would be sufficiently delicate and difficult, without any certainty in the result. It would be necessary, therefore, to extirpate the gland also; I do not know that this has ever been done; nor do I think that it ought to be attempted.

The *injection* of an irritating fluid into the emptied sac might effect a cure by inflammation and adhesion of the parietes of the cyst; but then the functions of the gland would be destroyed; the fluid which it would continue to secrete would find no exit, and would gradually distend the ramifications of the excretory ducts lodged in the interstices of the lobes which compose it; and might give rise to a swelling, attended with acute pain, inflammation, suppuration, and external fistula; the inflammation might also extend to the tongue, the larynx and other adjoining parts. In conclusion, if the disease is really seated in the excretory ducts of the salivary glands, the treatment by injection is not reasonable, and should not be proposed; if, on the other hand, ranula is nothing more than an encysted tumour containing a serous or albuminous fluid, injection may be resorted to with advantage.

The use of the *catheter* in the excretory ducts of the submaxillary glands is difficult; and as ranula does not so much imply the mere contraction of these ducts, as their obliteration by foreign bodies inclosed in the tumour, or by the products of inflammation, it appears to me that the use of small probes or bougies must be quite unavailing.

Cautery is one of the oldest remedies. Hippocrates, in speaking of this disease, recommends placing on the tumour a sponge containing a warm emollient fluid; when there was pus, he made an incision; and sometimes he waited for a spontaneous opening, and then used actual cautery. Celsus was satisfied with opening the tumour if it was small; otherwise he made a deeper incision, and then laying hold of the lips of the aperture, he cut away the cyst from the surrounding parts, and removed it, taking great care not to injure any of the vessels. Fabricius, who almost always followed Celsus, only proceeded as far as incision, which I have shown to be only a palliative. Marcus Aurelius Severinus, and Tulpius recommend actual cautery, but, according to the latter, only when the tumour is hard, and its parietes are very thick; if the contents are fluid, which may be ascertained by the touch, he thinks a partial excision sufficient. Ambroise Paré gives the same advice, and says that the opening should be made with a red-hot iron.

Acids have been proposed as preferable to actual cautery, incision, or extirpation; but here we are stopped by the fear of not being able to limit their action, or to prevent them from extending too far, even to the destruction of Wharton's duct. Camper says he has succeeded by making a wide opening in the tumour, and then touching it with caustic; but he acknowledges that he has been obliged to repeat this several times.

It appears from the preceding observations that the remedies for ranula, as far as they consist in discharging the fluid contents and preventing the aperture from closing, have been known to all who have written on the subject, but not one of them has hit the mark. It has been seen that all these modes of treatment are more or less defective, owing either to their difficulty, to the fright and pain inflicted on the patient; or, above all, because they only give temporary relief, the disease re-appearing in the course of time. I have made use of a sure and simple method, of which I will now give some account.

I considered that the most certain means of curing ranula would be to keep open the aperture made in the tumour by the introduction of some foreign body, to be retained in the cyst; on the same principle as I have acted in cases of lachrymal fistula. With this view I had a small instrument made, consisting of a hollow cylinder to admit the passage of the saliva. This cylinder was four lines long, and about two lines in diameter, and was terminated at each end by a small oval plate, slightly concave on the free side, and convex where it joined the cylinder; one of these plates was intended to be placed inside the sac, and the other exposed, in the cavity of the mouth. In fact, it resembles a shirt-stud. It may be made of silver, gold, or platinum; but the latter is the best, as it is less easily corroded by animal fluids. I used it for the first time on a young soldier, whose case is described below.

Case II.—*Ranula. Opening of the sac. Introduction of the instrument. Cure.*—Duchateau, aged 24, a drummer of the imperial guard, short and of bilious temperament, had a tumour under his tongue, which had existed for three years. It had grown slowly, without any kind of pain, but it interfered a good deal with the motions of the tongue. He came to the Hôtel-Dieu, in October, 1817. There was a small, oblong, semi-opaque tumour on the side of the frænum of the tongue, occupying the position of Wharton's duct, and appearing, in fact, to be produced by a dilatation of this, the excretory duct of the sub-maxillary gland. Various means had been tried, but they were only temporarily successful. Some practitioners had punctured the tumour to let out the fluid it contained; others had tried excision; and the edges of the aperture had been cauterised; but the disease returned after a time.

I operated as follows: I made an opening in the sac with a pair of curved scissors, from which a limpid, inodorous, viscid and ropy fluid was discharged. Holding the little instrument with dissecting forceps, I introduced it into the opening, leaving one end exposed in the mouth. The tumour immediately decreased, the incision cicatrized round the cylinder, and a fortnight after the operation, the patient left the hospital quite well. He ate, talked, and moved his tongue without the slightest inconvenience.

Having detected some imperfections in the instrument, I ordered some alteration to be made. The small external plate was too broad, and its raised edge irritated the under surface of the tongue, which was constantly in contact with it. The edges of the plates were, therefore, bent in a contrary direction, the convexity being external; their size was diminished, and they were made elliptical in shape. I also saw that the opening in the cylinder was of no use, since the saliva passed freely between the lips of the wound and the cylinder, and further, that it was soon stopped up by particles of food; the size of the cylinder was also reduced to three lines in length, and about one to one and a half in thickness. The length, however, must in all cases be regulated by the thickness of the parietes of the cyst. In the following case the instrument was not yet perfected, but the success was, notwithstanding, complete.

Case III.—*Ranula cured by incision.*—Tellier, aged 24, entered the Hôtel-Dieu, in October, 1820, with a tumour, which had existed for some years on the left side of the frænum of the tongue; it was ovoid in form, and its greatest diameter extended from the front backwards, between the left lateral portion of the tongue, and the internal surface of the lower jaw; it was the size of a small hen's egg, and gave rise to difficulty in speaking, mastication, and respiration.

I raised it with the forceps, and made an incision with a pair of curved scissors. An abundant discharge immediately took place, of a mucous, ropy, colourless fluid, and the tumour diminished in size. The instrument was introduced as in the former case. The passage through the cylinder was soon closed by particles of food. The patient was seen again eleven days after the operation; and then the saliva passed between the edges of the wound and the instrument, and the latter occasioned so little inconvenience that the patient was scarcely conscious of its presence. Some months afterwards he came to consult me for some gastric complaint; the instrument was in its place, and the tumour had not returned.

Many cases had been thus successfully treated, when the following one occurred, which enabled me to try two methods on the same person, who had two tumours of this kind, independent of each other.

Case IV.—*Double tumour. Insertion of the instrument in one. Incision of the other.*—A woman named Pic, aged 43, came to the hospital in July, 1824, having a soft tumour, as large as a small hen's egg, on each side of the frænum of the tongue. The voice was affected, as well as deglutition and respiration. It was ascertained that these tumours did not communicate with each other. Three months ago they had made their appearance without any ostensible cause; and a surgeon had opened them three times, but they closed and formed again after discharging a viscid, transparent fluid.

I availed myself of this opportunity to compare the plan I had adopted with that of simple incision. I operated on the right side, inserting the instrument; and on the left I merely made a wide opening. The latter tumour soon formed again; therefore, I treated it in the same way as the first, and with complete success.

The following is an example of the appearance of a multilocular tumour during the treatment of a previously simple one; and of the rapid growth which such tumours sometimes make.

Case V.—*Ranula. Operation. Appearance of a multilocular cyst. Cure.*—Vilocq, a cotton-manufacturer, aged 49, had experienced some inconvenience, for two months, under the left half of the tongue, where he perceived a small oblong tumour, which, since that time, had gradually increased in size. He came to the Hôtel-Dieu on the 21st October, 1821. On the left side of the frænum of the tongue there was an oval tumour, with its longest diameter in the direction from back to front, and a little from without inwards. It was 15 lines in length, and 6 lines in breadth. The tumour was soft and fluctuating; there was no change of colour in the mucous membrane; and it was without heat or pain, even on pressure. It lifted up the left side of the tongue, and pushed it towards the pharynx, whence arose considerable impediment in speaking, masticating and swallowing.

On the following day, I made an incision two lines long, about an inch from the end of the tongue, very near the spot where the mucous membrane of the mouth is reflected on to the lower surface of this organ. I afterwards inserted the little instrument obliquely into the cavity of the tumour, leaving one of the plates outside. A clear, viscid, ropy fluid continued to escape, and the tumour quite emptied itself.

On the third day after the operation the patient felt scarcely any inconvenience; the instrument remained in its place, and the fluid was discharged around it. On the twenty-fifth day, the instrument having escaped from the aperture over-night, the tumour began to form anew. On squeezing it, a great quantity of the same fluid came away. I tried to replace the instrument, but there was not room in the cylindrical part of it to admit of its being grasped by the thickened edges of the aperture in the tumour. Another was made, two lines longer in the space between the plates, which was inserted easily on the following day.

All went on well till the 15th January, when some uneasiness was experienced near the wound; and, soon after, a small tumour made its appearance immediately behind the plate which was exposed in the mouth. It resembled the first, and in ten days it increased to the size of a hazel-nut. On examination, I found that it was independent of the first, and that it was a multilocular ranula. I made a small incision into the sac, which discharged a rather large quantity of viscid fluid, without smell or taste. The tumour disappeared, and with it all inconveniences.

It will be seen from these cases that, when the tumour is very large and its parietes thick, it is better to make rather a large opening, and even to excise a portion of it, before inserting the instrument; and further, to delay this till the wound is partly cicatrized, leaving an opening only sufficiently large for its introduction. It will be seen by the following case, in which an accident occurred which it is difficult to explain, that the cicatrix is formed with great rapidity.

Case VI.—*Ranula. Incision. Fruitless attempts to keep the instrument in the wound. Syncope. Insertion of the instrument.*—Devaux, a gardener, aged 40, had felt, for about ten days, a slight pain beneath the left side of the tongue, where a small tumour soon appeared. It made such rapid progress that, when he came to the Hôtel-Dieu, it had attained the size of a small walnut; it was situated on the left side of the lower part of the mouth, extending towards the right as far as the frænum of the tongue. It was larger in front than behind, soft, fluctuating, of a violet-red colour, and semi-transparent; it gave no pain, but it interfered greatly with the movements of the tongue, and altered the voice in a peculiar manner. The patient said that, when he spoke, the tumour vibrated, and occasioned a peculiar tremor, which extended to nearly the whole head. In other respects, he was in good health. I operated as follows: the head being supported by an assistant, the left side of the mouth was drawn down, and the tongue brought out of the mouth and turned over to the right; in which position the tumour became more prominent.

I made an incision at the top, from which a large quantity of transparent, ropy fluid was discharged. The canula was then inserted; but the wound being too wide, it came away directly. Repeated attempts were made, but without success; and whilst this was proceeding, the patient, from some cause or other, fainted. He soon came to himself, but was unable to speak for four hours. The introduction of the instrument was deferred till the following day, when the wound was very nearly closed; it was found necessary to open it with a probe, and the canula was inserted, and kept in by a pledget of lint, which was retained *in situ* by closing the jaws.

I need not cite any more cases of successful treatment by means of this little instrument. The other means proposed,—such as bougies, canula, setons, &c.,—are of difficult application, and are often unbearable; moreover, the object of them is to form a fistula; and experience has shown that, as soon as the foreign body is withdrawn, the fistulous opening closes, and the disease returns.

But it must be borne in mind, that any particular methods of treatment or remedies are not to be regarded as exclusive; and that they must be used only when fitted for the peculiar disease. When inflammation attacks the excretory ducts of the sub-lingual and sub-maxillary glands, it may also produce ranula. In these cases, the tumour is quickly formed and rapidly developed; and the tension, pain and redness of the parts will prevent this from being mistaken for the other kind, which is produced from quite a different cause. In the cases now under consideration, the retention of the saliva is the effect of inflammation; and as soon as the cause is removed, the effect will naturally subside. The inflammation must, therefore, be subdued; and local bleeding, either with the lancet or leeches, should take precedence of any operation. Ranula may, in such cases, be compared to retention of urine, arising from inflammation of the bladder or its appurtenances. Evacuation of the fluid is only an auxiliary measure; and recourse must be had to general and local antiphlogistic remedies. The following case will prove the correctness of these observations.

CASE VII.—*Ranula of an inflammatory character. Antiphlo-*

gistic treatment. Cure.—Marie Engrot, aged 21, had suffered, for six years, from a hard tumour formed by the sub-maxillary gland beneath the lower jaw on the right side; and it had attained the size of a hen's egg. It was very painful when touched; and the slightest pressure forced a jet of fluid, a mixture of pus and saliva, into the mouth. Three weeks before, another tumour had formed beneath the tongue, which arose from an accumulation of saliva in Wharton's duct: it appeared to be separated into two equal parts by the frænum, and was hard and resisting; the speech was impeded in that peculiar manner which has given the name to the disease. Respiration and deglutition were performed with difficulty.

Having examined the patient, I considered that the tumour was of an inflammatory nature; and my opinion was founded on the pain, the redness, and the resistance of the dilated duct. I therefore used the ordinary measures, applied leeches and emollients, and had recourse to counter-irritants. These means were successful; in four and twenty hours there was a decided improvement; and, on the sixteenth day, the patient quitted the hospital. She then felt no pain; the tumour in the mouth had disappeared, and the voice had assumed its natural tone.

I have already stated, elsewhere, that ranula resembles other tumours developed in the locality that is assumed to be peculiar to it. Inflammation of other tissues, in the sublingual or sub-maxillary regions, may give rise to tumours having the external appearance of, and some analogy with, ranula. Such are certain abscesses, the serous cysts to which I have alluded, and sero-mucous cysts of the same character as those mentioned in the first part of this article. The diagnosis is frequently very obscure, as will be seen by the concluding case.

CASE VIII.—*Tumour resembling ranula. Puncture. Extirpation. Cure.*—A sempstress, aged 69, was received into the Hôtel-Dieu, having suffered from the following affections during the previous four months: An indolent tumour had appeared below, and to the left of, the point of the tongue, which was pushed aside by degrees; at length, having got beyond the floor of the mouth, it protruded at the upper part and left side of the neck. Several medical men had been consulted, and they pronounced it to be ranula. When she entered the hospital, four months after the disease first appeared, the tongue was raised up and pushed to the right by a tumour as large as a pigeon's egg: it was insensible, soft, and distinctly fluctuating; and, passing through the muscular floor of the mouth, it was prolonged to the upper part of the neck. There it swelled out anew, and formed another tumour as large as an ordinary apple. It was insensible, like the other, and appeared also to be fluctuating. Otherwise, the patient's health was good, excepting great physical and moral irritability.

The origin, form, and consistence of the tumour might easily be deceptive as to its nature,—it might be ranula or lipoma. To remove all doubt, I made a puncture in that part of the tumour which raised the tongue. The bistoury was plunged deeply, and no fluid was discharged, but some fatty flocculi came from the lips of the wound, and showed the lypomatous nature of the disease. It was extirpated on the 4th July; but this operation is apart from our present subject.

Although this case is an example of the numerous difficulties which are encountered in the diagnosis of tumours in general, there were some peculiarities which might have led to the detection of its true nature, independently of the exploring puncture. The size of the tumour in the mouth was less than is usual in old ranulæ, which pass down to the neck. As the tongue offers much less resistance than the muscles between the os hyoides and jaw, it is evident that a tumour arising from a dilatation of Wharton's duct would extend itself far into the mouth, before it distended the muscles which constitute the floor of this cavity. Another character in which this tumour differed from ranula, was a sort of strangulation which occurred in the middle, where the tumour passed from the mouth into the cervical region. When ranula extends to the neck, it is altogether more uniform in shape and rounded, like that part under the tongue. From these differential characters, therefore, it might have been suspected, *a priori*, that this tumour was not a ranula; which was, however, completely set at rest by the introduction of the exploring needle.

SECTION III.

ON THE INTRODUCTION OF FOREIGN BODIES INTO THE AIR-TUBES AND THE ŒSOPHAGUS, AND THE TREATMENT OF THESE ACCIDENTS.

The introduction of a foreign body into the respiratory passages is always a distressing occurrence; indeed, if the patient is not relieved, he may very soon die. An operation will not always give this relief; but under more fortunate circumstances, the foreign body presents itself at the aperture, and is forced out by a strong expiration; sometimes it is extracted with forceps, or it may be found afterwards between the lips of the wound. But, in every case, the utility of an operation is apparent, since nothing else can be done; as the opening of the glottis, which will easily admit certain bodies, —such as a bean, for example,—will not, in the majority of cases, allow of their expulsion; disease of the lungs supervenes, which frequently leads to the death of the patient.

Case I.—*A bean in the air-passages of a child. Tracheotomy. Expulsion of the foreign body.*—A little girl, 8 years old, stole a bean in a shop, and swallowed it precipitately. From its shape and lightness, this perhaps, of all bodies, finds the most easy entrance into the aperture of the glottis, when drawn in by the breath: such was the case with this child; and she immediately had violent cough, and was nearly suffocated. This accident occurred on Thursday, at 3 P.M. M. Delens, and some others who saw her, prescribed an emetic, which produced vomiting, but the bean was not expelled. The night, and part of the following day, passed with alternations of quiet and suffocation; and the child was brought to the Hôtel-Dieu on the evening of Friday.

During the night, the symptoms continued with fearful violence. On the following morning, I ascertained their nature: I could hear the movement of the foreign body in the trachea (a sort of vibratory sound which is easily detected by applying the ear above the sternum, or simply by listening attentively to the breathing). The efforts of coughing were violent, accompanied by nausea, and even by glairy vomiting. The course to be pursued was plain, and the child was carried to the theatre on Saturday morning, 13th February, 1830.

Before operating, I tried to detect the vibratory sound, which is a pathognomonic sign of the presence of a foreign body in the trachea; but I could not hear it, doubtless because the bean was then retained in one of the bronchial tubes. As it was certain that it had not come away spontaneously, I determined to open the trachea.

I made an incision one inch in length in the median line of the throat, a little above the upper edge of the sternum, carefully dividing the skin and the cellular tissue, and separating the muscles covering the trachea. I thought I had penetrated the air-passage, and I introduced a pair of forceps into the lips of the aperture. The screams of the patient, which were very piercing during the incisions, continued; the air did not pass through the wound; and I was surprised that the foreign body did not make its appearance immediately, as is usually the case. After having in vain tried dilatation, I inserted a bistoury to the bottom of the wound, for the purpose of enlarging the opening; suddenly, the air escaped with a hissing noise, the screams ceased, and the bean was forcibly expelled through the orifice in the trachea. It was evident that the air-passage had not been opened during the first part of the operation, a circumstance which should be borne in mind by operators.

The edges of the wound were carefully cleansed of the frothy blood which covered them; a piece of fine linen, covered with cerate, was placed in front of the throat, which was kept in place by compresses and several turns of a loose bandage.

The patient cried a good deal; and her voice remained even when part of the air escaped from the opening in the trachea. Nothing untoward occurred in connection with the operation. There is a difficulty, however, which may present itself in operating, and which I think it right to point out. Between the sterno-thyroid and the sterno-hyoid muscles and the front of the trachea, is a space filled with cellular tissue, in which instruments may lodge, as they might do in the trachea itself. When the elastic rings are cut through, the forceps, instead of penetrating the trachea, may be involved in this cellular tissue, and the operation would, consequently, be incomplete. A little attention will suffice to prevent the operator from being thus misled.

The bean was five lines long, by three in width and thickness. It was a little uneven, in consequence of the swelling of the cotyledons: they have, indeed, been seen in a state of incipient germination; but, as this had been but a short time in the air-passages, it had not attained any size.

In the evening, the symptoms of bronchitis were sufficiently intense to require bleeding from the arm. The patient passed a bad night. On Sunday, there were alternations of quiet and dyspnœa; respiration was carried on almost entirely by the wound, and it was loud, in consequence of the collection of mucus. On the evening of the same day, five leeches were applied in front of the throat; they bled freely, and the patient was comfortable; the cough was less frequent; she passed a pretty good night, and had but little fever.

On the 15th, respiration was easy; a slight whistling could be heard at the wound; the skin was of its natural colour. The 16th and 17th were good days, the sleep calm and quiet, speech easy, and without change; very little air passed by the wound, which might be attributed, in great measure, to the puffiness of the edges. On the 20th, the lips of the wound were brought together; there was no danger from emphysema, because the mucous membrane covered the edges of the incision, and rendered the cellular tissue impermeable.

From this time no accident occurred. A few days after, the parents of the girl took her home; the wound was then reduced by two-thirds. She was brought to the Hôtel-Dieu again on the 12th March, a month after the operation, when there was still a very small opening, by which a stream of air passed. The patient did not come again.

Several interesting considerations may be deduced from this case, to which I will direct attention; and, in the first place, I will say a few words as to the position in which the patient should be placed during the operation of incision of the external soft parts and the trachea; and afterwards, when the opening has been made, so as to assist in the expulsion of the foreign body.

It is evident that the best mode of making the incision of the external soft parts and the trachea, is by holding the head back; but this position is unfavorable for the passage of air from the trachea, and still more so for the expulsion of the foreign body. Indeed, we have seen in the above case, that the incision first made in the trachea did not give vent either to air or to the foreign body. This was probably owing to the small extent of the incision; but it certainly, in part, proceeded from holding the head back.[1] When the head is thrown back, the edges of the wound are kept together; when bent forward, on the contrary, the edges separate more easily, and allow the air and the foreign body to be expelled, especially when this is done by a spontaneous effort. Thus, I may lay it down as a useful precept, derived from this and other cases of operation for tracheotomy, to hold back the head for the incision of the soft parts and the trachea; but to bend it forward, to admit of the passage of the air and the spontaneous expulsion of the foreign body.

As regards the diagnosis of foreign bodies in the trachea, there is one sign which I think it will be well to add as characteristic, namely, the sensation of the body striking against the walls of the canal, which may be detected by the hand or the ear. This is not equally distinct in all cases, nor at all periods of its continuance in the trachea. Indeed it may be adherent, and therefore, not being moved by the air, it cannot strike against the sides of this tube; or it may be enveloped in thick mucus, and the shock be much weaker than when it is free.

The mode of dressing also deserves attention. The edges of the wound were not brought together at once, for fear of emphysema, as during the first few days the permeable cellular tissue readily admits of the ingress of air; but after this, it is altered by inflammation and becomes compact, when this is no longer to be apprehended; and the healing may be hastened by bringing the edges of the wound together. This should be always followed as the most prudent and rational course.

[[1] *i. e.*, If in this instance the trachea was opened at all at this time, which does not appear to have been the case.—T.]

Case II.—*Bean in the air passages; tracheotomy; cure.*—A boy, six years old, was amusing himself on the 18th May, 1822, by throwing beans into the air and catching them in his mouth, when one of them passed the epiglottis into the air passages; he was instantly seized with cough and a sense of suffocation, in which state he remained for an hour. He then became quiet and took some food, but the symptoms soon returned. The cough was suffocating, vomiting frequent, and anxiety extreme. A medical man was called in, and he thought (why, it does not appear) that the foreign body was in the œsophagus, which he probed repeatedly, and administered emetics; but these means were, as might be foreseen, unsuccessful. The patient was choking continually, had rattling in the throat, and complained of very acute pain in the trachea, which probably induced the doctor to apply leeches on the throat.

On the fifth day the symptoms became so alarming, that the parents of the child considered it necessary to seek further assistance; and he was brought to the Hôtel-Dieu, on the 23rd May. The following were the symptoms: great dejection, proceeding partly from his sufferings and partly from the fatigue of the journey from the country; voice gone, face puffed, eyes projecting and injected, nose and lips bluish, respiration very quick, and accompanied by a loud rattling sound in the trachea, which extended also considerably into the bronchial ramifications. During inspiration there was a noise at the bottom of the larynx, as of a body rubbing or striking against it, similar to that of a valve flapping backwards and forwards against the edges of the opening it is intended to close; a peculiar sort of sound that could proceed only from the shock of a foreign body coming in contact suddenly with the edges of the glottis when moved by the current of air. During respiration a convulsive cough came on, at unequal intervals, which took away the patient's breath and threatened him with suffocation. Asphyxia was imminent, and it was necessary to adopt some immediate step to afford relief. Tracheotomy appeared to be the only chance of saving the patient; and although the case was serious, I did not hesitate, and proceeded with the operation as follows:

The child lay on his back with his head a little thrown back;

I made an incision extending from the inferior portion of the cricoid cartilage to the upper part of the sternum, dividing the skin and the subcutaneous cellular tissue. An extensive ecchymosis, proceeding from the bites of several leeches, rather increased the difficulty of the operation; another deeper incision, however, layed bare the trachea. As very little venous blood came from the edges of the wound, I hastened on with the operation; I grasped the trachea between the thumb and middle finger of my left hand, and introduced the fore finger into the wound as far as the trachea; this served as a guide to the bistoury, with which I made a puncture in the trachea, and slightly increased the opening downwards; the air escaped accompanied with blood and mucus. After giving the patient a little rest, I enlarged the opening with a blunt-pointed bistoury, to the extent of an inch or an inch and a quarter; a larger volume of air passed out, with mucus and blood. I introduced into the lips of the wound the blades of a pair of forceps, to keep them apart and admit of the passage of the foreign body, which showed itself twice at the aperture; I tried to seize it with the forceps, and succeeded once, but only a small fragment came away, and the rest was expelled by a strong expiratory effort. It was a bean, as the child had said, and had increased considerably in size. The patient felt almost immediate relief. A great quantity of thick mucus came away, mixed with blood which had passed into the air passages during the operation. The patient was carried to bed. Though the wound did not bleed, it was not thought advisable to unite the edges at once, for fear of emphysema in the cellular tissue. The wound was dressed simply with linen covered with cerate, on which some lint and a compress were applied; barley-water &c., to drink.

On the 24th, the livid tint of the nose, lips, and cheeks was replaced by considerable redness. There was fever during the day; a good deal of mucus passed from the opening; the cough was frequent, but during the night the patient had some sleep; there was mucous rattle through a great extent of the anterior and superior region of the lungs; the pulse, which was very weak before the operation, had acquired strength, and was rather hard and frequent; skin, hot and dry; respiration quick. Leeches were applied to the lower part of the neck;

the same dressing as before; the edges of the wound were left separate. Barley-water, &c., for drink.

The succeeding night and following day pretty good; the leeches appear to have quieted the irritation of the bronchial tubes and the trachea; the face was less flushed; respiration still frequent, but rather less difficult. Pus and a great quantity of mucus coming from the wound; mucous rattle; constipation for three days; fever rather high. The edges of the wound were brought together with strapping and graduated compresses. A mild mercurial dose was administered; barley water, &c.

On the 26th, there was much cough and increased fever during the day. The patient was greatly agitated; the bandage applied to keep together the edges of the wound had been deranged by the violent fits of coughing; he did not, however, pass a bad night, and had some sleep. Respiration continued difficult and quick, pulse frequent, skin hot and rather moist. It was feared that a troublesome form of inflammation might occur in the air passages, or else phlegmon in the cellular tissue of the neck, about the wound. Some ipecacuanha was ordered, and six leeches were applied to the front of the trachea.

On the 27th, there was sensible amendment. The leeches had been of great service; he had not taken the ipecacuanha. Cough less frequent; respiration still rather quick, but less difficult; febrile action moderate; a quantity of pus coming away from the edges of the wound, the dressing on which kept its place. The child was weak and pale, and asked for food. A few spoonfuls of broth and a little boiled meat were allowed.

On the 28th, the improvement continued; cough much less frequent; fever had almost left him; respiration but little embarrassed; voice natural. Though the lips of wound yielded a quantity of pus, they were nearly united; no mucus passed; appetite good. Milk and barley-water, and broth.

The 29th, no more fever. The edges of the wound granulating; but air still passed; little cough; a slight mucous rattle; good appetite.

Up to the 4th June nothing particular occurred. The child was quite convalescent; the wound, which was nearly cicatrized, still discharged a little pus; but neither air nor mucus. The cough had nearly ceased, and the voice was in its normal state; the digestive functions were performed healthily. The pain, loss of blood, and spare diet, had considerably weakened the little patient, who much wished to go home, and was sent accordingly.

It often happens that the foreign body, whatever it may be, is not expelled immediately after the operation, although coughing, sneezing, nausea, and other provocative means are resorted to. In such cases the lips of the wound should be kept apart by means of a small silver tube, or lead or silver wire. It is always indispensable to apply some dressing to the wound, but lint or other light substance should not be used; as such bodies have been known to insinuate themselves into the trachea, giving rise to very serious mischief.

I performed an operation, about eighteen years ago, at the Hôtel-Dieu, in a very similar case to the last. The bean did not come away on opening the trachea, nor on the next day; on the third day it was found by the assistant on the dressing. The cure was completed in a short time.

When the bodies introduced into the larynx and trachea are very light, round and easily moveable, the difficulties are increased, as they obey the impulses of the air more readily, and move about in the air passages with less obstruction. Such bodies as are fixed, either in the ventricles of the larynx, in the aperture of the glottis, or towards the bifurcation of the bronchial tubes, produce a constant pain and a permanent difficulty of breathing, rather than those sudden fits of suffocation which I have had occasion to notice. Indeed, it may occur, under certain circumstances, that the mucous membrane becomes reconciled to their presence, and that the patient feels no inconvenience until they move to another part.

CASE III.—*A half-franc piece in the trachea. Intermittent fits of suffocation. Subsequent death from phthisis.*—A young man, whilst amusing himself by throwing up a half-franc piece and catching it in his mouth, let it slip into the air passages. After the first effects of the accident had subsided, irregular fits of coughing and suffocation succeeded, during which the foreign body appeared to pass from one extremity of the trachea to the other. During the intervals of quiet, the position of the piece could not be ascertained, and the patient felt very little difficulty in breathing. He much wished for the operation, but there would have been little propriety in performing it when the foreign body was fixed in a position that could not be ascertained.

For five years the piece was moveable, and at intervals caused great discomfort; but afterwards it became fixed in a bronchial tube, and occasioned but little inconvenience.

The patient was attacked by symptoms of phthisis in India, whither he had gone on business, and he died ten years after the accident. The piece was found in the middle of a tubercular cavity. The patient was then 36 years of age, and was originally of a robust constitution.

From this case we learn that a very hard, small, foreign body may not be expelled after it has been received into the glottis, although it might be of a form which would render such expulsion easy; and, indeed, this most commonly happens. Sometimes, however, the body is expelled forcibly, as I once saw in the case of a lawyer's wife. This lady, having allowed the pip of an orange to pass into the windpipe, had frequent spasmodic symptoms. The most characteristic feature was a sound like the whistling of air through a brass tube. After trying various means, the pip was expelled. The case reported above shows that the retention of a foreign body may give rise to such serious consequences, that everything should be tried to prevent them.

Suffocation is not always the effect of the introduction of foreign bodies into the air passages; but it may arise from abnormal growths, polypus, &c.

CASE IV.—*Intermittent fits of suffocation. Death. Autopsy. Polypus causing stoppage of the glottis.*—An elderly man was admitted into the Hôtel-Dieu, with disease of the urinary passages. He experienced from time to time fits of suffocation, which were attributed to asthma, or spasm of the glottis. The soundness of the respiratory functions during the intervals between these fits, lulled any suspicion of disease in these parts, and consequently nothing was done. The patient died quite suddenly in one of these spasmodic attacks.

On opening the body it was found that the glottis was completely closed by a growth consisting of cellular and vascular tissue covered by mucous membrane. It was a true polypus, which had its origin in one of the folds which extend from the sides of the epiglottis to the arytenoid cartilages. It was more than 18 lines long, and was bifurcated at its free extremity. This polypus was suspended at the lower extremity of the cavity of the pharynx, and whilst in this situation it produced no inconvenience; but when, by a change of position, it rose above the aperture of the glottis, it more or less closed this opening, and its presence thus gave rise to the above mentioned symptoms. The patient died from a sudden and complete stoppage of this nature.

This is a rare and highly interesting case, and affords another proof of the utility of careful examination in analogous instances. The symptoms of suffocation, which occur suddenly without appreciable lesion of the lungs, should be examined by the finger, the eye, and the ear. Doubtless the existence of this polypus might have been ascertained during life, and it might have been easily extirpated; it is a lesson for the future, and it will not, I trust, be lost.

M. Louis has shown me a pedunculated polypus which was developed at the bottom of the bladder, and which gave rise to intermittent retention of urine. It had caused considerable hypertrophy of the coats of the bladder, and well demonstrated the mechanical cause of certain forms of hypertrophy of the heart.

Sometimes death will take place before it is possible to operate. Ten years ago I was called in to see a patient who was seized with symptoms of suffocation whilst eating. When I arrived, accompanied by M. Marx, the patient was dead. On opening the body we found all the sinuses of the brain gorged with blood. All the organs were healthy; but the upper part of the air passages was plugged by a piece of meat of the size of a walnut.

The operation of tracheotomy is not performed solely to assist in the expulsion or extraction of foreign bodies; it is applicable also in cases of stoppage of the glottis by the development of a false membrane, or the swelling of its mucous membrane. Thus, for example, we have seen it succeed in croup, and quite recently it was most successful in a case of angina with œdema, of which I will narrate the details.

CASE V.—*Acute laryngitis become chronic. Œdema followed by asphyxia. Tracheotomy. Cure.*—On the 24th October, 1832, Mad. B—, a governess, aged 34, was brought to the Hôtel-Dieu, in a state of suffocation, which threatened fatal consequences every moment. She had been attacked five months previously with inflammation of the throat, and severe bronchitis. For a length of time she had experienced pain and heat along the anterior part of the neck; the voice had become hoarse, and for several days there was entire loss of speech. Quiet, bleeding, the application of leeches, and emollient and soothing drinks, allayed the greater part of these symptoms. Soon after this amendment took place, she resumed her usual occupation, and went to church to sing with her pupils. This tired her very much, and the symptoms soon returned, with less severity but greater tenacity.

The patient had frequent cough, and constant pain and heat in the larynx; the voice was altered, respiration difficult, sometimes at night whistling, and of a convulsive character. She was better at times, but at length was compelled to come to the hospital. The posterior wall of the pharynx was red, slightly painful, and a little swollen; the larynx and all the surrounding parts were the seat of peculiar uneasiness. Respiration was difficult; inspiration was accompanied by whistling sound; voice hoarse and weak; the patient complained of very distressing pain behind the lower part of the sternum. During sleep, which was of short duration, respiration became more difficult, and the laryngeal whistling more perceptible.

On the 25th, 26th, and 27th, the treatment was simple, consisting of mild drinks to promote expectoration, foot-baths, sinapisms, poultices round the neck, and soothing gargles. The disease continued increasing, and the uneasiness about the larynx became greater; the patient fancied she had a foreign body in her throat, which prevented her from breathing; the cough came on by fits of some duration; the laryngeal whistling became louder; the voice was very hoarse, very weak, and interrupted; there was prostration, drowsiness during the day, sleeplessness, and great disquietude at night; the countenance was expressive of anxiety; the pulse had sufficient power, without being frequent, but was irregular during the fits of coughing. At this period M. Husson touched the upper aperture of the larynx, and fancied he detected a swelling; he, as well as Recamier and Broussais, thought that the disease was angina with œdema.

On the 29th, 30th, and 31st October, seven grains of ipecacuanha were administered three times each day; there were several evacuations both from the stomach and bowels; the vomiting was accompanied by rather serious symptoms, such as convulsions, afflux of blood to the brain, and frequent cough, threatening suffocation. On the 30th, the last dose was not given.

These means were as unsuccessful as those previously tried. The disease still increased. Recourse was had to marsh-mallow emulsions, sinapisms to the legs, leeches to the vulva. The catamenia were scanty.

On the 2d November the dyspnœa had increased; she was bled largely from the arm, and sinapisms were applied to the thighs; a purgative injection was prescribed.

On the 3rd, the same; thirty leeches were applied to the lower part and sides of the neck; in the evening the patient was rather better. On the 4th, the night had been distressingly restless; in the morning the respiration was very irregular and spasmodic; the air could scarcely be heard entering the chest; inspiration was so difficult that it produced a sound like the lowing of a cow; the patient was obliged to sit upright. Copious bleeding from the arm; sinapisms to the thighs.

On the 5th, state the same. I was consulted; I examined the patient, touched the superior opening of the larynx, detected a considerable obstruction, and was satisfied of the presence of inflammatory œdema. Another bleeding. Sinapisms to the legs and arms.

On the 6th and 7th, the repeated fits of suffocation betokened that death was imminent, unless recourse was had to energetic measures. Hæmatosis was already partly suspended, and imperfect oxygenation of the blood gave to the complexion a leaden hue; there was distressing dyspnœa. During the cough, the face remained pale or became red. The patient was in a state of agony impossible to describe; her features were distorted; she was alarmed and thought she was dying. She was again bled from the arm, without any amendment. At three o'clock tracheotomy was considered indispensable, and I operated as follows.

The patient being recumbent, with the head bent back, I made an incision an inch and a half long, in the median line of the neck, in front of the trachea, beginning at the lower edge of the cricoid cartilage. Having reached the trachea without dividing any artery that required a ligature, and made a puncture between two of the cartilaginous rings, I made an incision an inch long from below upwards, with a blunt-pointed bistoury; I then made two small transverse incisions in the trachea, giving a crucial form to the wound; the aperture immediately allowed the escape of air and mucus from the trachea and the bronchial tubes; and the patient felt instant relief.

The respiration and the pulse became more regular by degrees; the pallor and the drowsiness diminished, and the patient had several hours' sleep during the night. On the following morning she said she was rather better; the air passing through the wound gave out a metallic sound.

On the 9th, it was observed that the aperture had a tendency to contract, and was partly effaced by the mucus and pus which dried and hardened round its edges. An elastic gum tube, seven lines in diameter, was introduced; this was taken out and cleaned occasionally. As the slightest effort of coughing displaced this tube, an ivory one was substituted, which was again replaced by a small instrument like a pair of dissecting forceps, the two ends of which, when separated, kept the lips of the wound apart.

On the 12th, a gentle purgative was administered; also some broth with sulphate of soda. On the 14th, I introduced a seton at the nape of the neck. On the 16th, on closing the wound for a moment, it was observed that the speech was less hoarse, respiration easier, and the whistling noise less intense.

On the 20th, I enlarged the opening, dividing a fibro-cartilage. The exhibition of calomel was continued till the patient left the hospital, on the 5th December. She was then in a satisfactory state, though not quite well. The wound was nearly healed, and the affection of the larynx had almost disappeared.

On the 20th January, the patient wrote from the country to say that the aperture was quite closed, that the cough occurred only at long intervals, and that the hoarseness had very greatly diminished.

On the 31st March she came to the Hôtel-Dieu; she was quite cured, and in perfect health.

I will make no remarks on this interesting operation. Those who remember having seen the patient can alone appreciate the benefit she derived when many had entirely given her up.

It must not, however, be supposed that the opening of the air passages is a resource to be relied on, when the parts are the seat of any serious disease. It may be asserted that success in such cases is the exception. Further, surgeons have acknowledged long ago that the operation of tracheotomy, which presents so little danger, and is attended so seldom by accidents when performed on healthy parts in which foreign bodies have been introduced, is almost always fatal when performed on diseased organs. I am quite of this way of thinking, and as I have performed this operation very frequently, my opinion is the result of experience.

I do not wish, however, that the question should be decided on my authority alone, for, after all, facts are the most powerful authorities.

[1] This operation has been known from the most remote times, for it is said to have been invented by Asclepiades; it was afterwards described by Paulus Ægineta and Avicena, who placed little confidence in it; for Paulus himself, whilst praising it, says it is seldom successful. Louis, who has most recommended it amongst the moderns, scarcely ever performed it except for the extraction of foreign bodies. Maunoir, of Geneva, who was one of the first to recommend it in cases of croup, has not derived much advantage from it; and Pelleton, who had practised it a great many times at the Hôtel-Dieu, and has published his observations, was successful only in

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[1] [It should be remarked that the following observations are from the pen of one of the editors, M. Marx; but, as they are introduced here, it is to be presumed that they are based on the opinions of M. Dupuytren.—T.]

cases of foreign bodies, and he regarded it as always inefficacious and dangerous in cases of croup.

It is worthy of remark that the most skilful and experienced men agree in acknowledging that there is but little chance of success in the cases I have pointed out. It must, therefore, appear very extraordinary that this operation should have been latterly proposed in cases of croup, as a remedy frequently efficacious, and likely to become much more so if performed at an early stage of the disease. In support of this assertion numerous cases of cure have been cited, operated upon under the most unfavorable circumstances, of which one in four was successful. It has been deduced from these facts, supported by the cases in which the operation has been performed early, that if the operation were performed at the beginning, half the number of cases would be cured.

But here, setting apart the first results of one out of four cured, it is of importance to notice the last assertion, for if taken seriously by practitioners, it might have the worst results; as other therapeutic means would be neglected, and recourse would be had to the operation, which, in our opinion, can have but a fatal result in cases of confirmed croup.

All practitioners agree as to the difficulty of a positive diagnosis of croup at the commencement of the attack; and when the nature of the disease is placed beyond doubt, it is almost necessarily fatal; thus, neither the sound of the voice, which is said to be the most certain indication, nor even the false membrane which is expectorated, are indubitable evidence; for the hoarse croupal voice occurs in many cases of angina so common to children; and the false membrane occurs in various diseases of the air passages, which are not so serious as true croup. Now, the uncertainty of these signs will not prevent the able practitioner from employing such active medicinal means as may be adapted to combat the disease which he suspects, as well as the symptoms which he observes; whereas he might be stopped altogether, were he influenced by the propriety of having recourse to so serious an operation as tracheotomy. Should he go on, would he not be taxed with imprudence and unskilfulness if the patient should die? for he would have performed an operation which nothing could justify; and if the patient recovered, might he not reasonably be told that there was no proof that the operation had cured the croup, since the symptoms observed might have been those of another affection? And this dilemma will be so much the stronger against the doctrine here opposed, inasmuch as the author who maintains it declares that the less the patient has been bled so much the more favorable are the chances of the operation; which is tantamount to disapproving of one of the most successful agents in the cases of angina referred to.

But in regard to croup, as well as to œdema of the glottis, it should be known that constriction of the aperture of the larynx is not the principal disease. In œdema of the glottis, the ulceration of the larynx, the disease of the cartilages, and the causes of the œdema itself, are, in truth, the most serious incidents; also in cases of croup, it is the inflammation of the whole mucous membrane of the air passages, and that plastic secretion which is observed in the ultimate ramifications of the bronchial tubes, as well as in the larynx and the trachea, which constitute the elements of the disease. Now, will it suffice, in this case, to open the trachea, to clean out its interior, and to apply small quantities of caustic in solution, to modify this morbid state, and arrest the deposit of the false membrane? Here experience again supplies an answer. This method, which appears to have been so successful with its author, has not been equally fortunate in the hands of other practitioners.

Cases of croup, or, to speak more properly, of croup-like affections, are sufficiently frequent, and consequently the opportunities of practising tracheotomy sufficiently numerous, to admit of a due appreciation of the utility of this measure. Here are the results which these operations show, according even to the confessions of those who performed them:

	Operations.	Cured.	Dead.
Amussat	6	0	6
Beaudelocque	15	0	15
Blandin	5	0	5
Bretonneau	18	4	14
Gerdy	6	4	2
Guersent	6	0	6
Roux	4	0	4
Trousseau	80	20	60
Velpeau	6	0	6
	146	28	118

Thus, admitting that all those operated upon had true croup, we have 28 recoveries against 118 deaths. But there is one great objection to any proceeding which has a chance of success only in the hands of its author, namely, that after he is gone, it is almost necessarily abandoned. Therefore, we do not the less persist in regarding tracheotomy in croupal affections as a desperate resource, and almost always followed by death.

The real cause of the ill success of this operation in cases of morbid lesions of the air passages, is certainly owing to tracheotomy not reaching at all the cause of the disease; for inflammation continues its course, and albuminous deposits continue to form in the small ramifications of the bronchial tubes; these assertions are proved by post-mortem examinations. Now, in opening the trachea, the risk of the operation is added to those of the disease, the effects of traumatic inflammation to those of existing inflammation; the fatal chances of the latter are aggravated; and most practitioners have confessed that the operation in such cases generally hastens the death of the patients.

In œdema of the glottis the operation seems to hold out better chances of success, and we have seen, in fact, that it does succeed. There is only one obstacle, and that is below the opening made in the trachea; if the air enters freely into the lungs, recovery ought to follow the operation; yet this is by no means the case, and most commonly the patients die; but this is because the affection is not a simple one, and because the lungs are almost always seriously diseased. This distinction is very important, since the probable success of the operation depends upon the lesion being local. The diagnosis of cases in which tracheotomy is expedient, is sometimes attended with great difficulty.

In the month of June, 1839, a woman was received into the Hôtel-Dieu, with all the symptoms of imminent asphyxia. The obstacle appeared evidently to exist in the glottis. After using all the remedies prescribed in such cases, tracheotomy was resorted to. The percussion of the chest gave a normal sound; respiration was feeble, accompanied by a slight rattle. The woman having died on the following day, the autopsy was made with great care. The glottis was of the ordinary size; the submucous cellular tissue was not infiltrated by serum, nor swollen; there was merely a slight injection. The trachea and bronchial tubes showed no trace of disease. It was impossible to assign any other cause for her death than a functional disturbance of the part.

When the disease is beyond the resources of art, tracheotomy may be performed with the view of prolonging the life of the patient; as happened in the following case.

CASE VI.—*Cancerous tumour of the neck. Tracheotomy. Death.*—A—, aged 18, of weak constitution, had been the subject for some time of a large hard tumour on the right side of the neck, below the angle of the jaw; it extended internally as much as externally, interfering with respiration and deglutition, and giving rise to shooting pains. She came to the Hôtel-Dieu six months previously. The nature of the pain, the peculiar appearance of the tumour, and the deterioration which had commenced in the health of this young girl, led me to believe that the disease was of a cancerous nature; its situation and its depth made it dangerous, perhaps impossible, to extirpate it. Some palliatives were administered, and she left the hospital. About two months afterwards she came again, in a much worse state; the tumour was twice as large; a sort of dull fluctuation or softening was felt at the upper part; the tumour was, as on the former occasion but more certainly, pronounced to be cancerous and incurable. The patient had become much thinner, her complexion was much changed, deglutition and respiration were more difficult. She continued getting worse from day to day, and at last death from suffocation appeared at times imminent. I recommended that tracheotomy should be performed, if a more serious attack should occur. The patient, I observed, may die from suffocation at any moment in extreme agony; whilst by cutting into the trachea, she will breathe freely, may have a month longer to live, and will perhaps die in a less painful manner. On the following day a frightful fit of suffocation came on, and the operation was at once performed by the house-surgeon. The lower part of the thyroid (?) membrane, and two or three rings of the trachea were cut through, and an elastic gum tube was introduced into the wound; respiration was restored, and the patient was relieved instantly. She passed the month, as I had foretold, with tolerable quiet. By means of the œsophagus tube, some drink and liquid food were administered. For one or two days she seemed to improve; but she soon relapsed; the cough became more violent, and during these fits of coughing she threw up a large quantity of fetid sero-purulent matter, which, judging from the condition of the right side of the chest, I thought proceeded from a vomica existing in the upper portion of the right lung, near the bronchial tubes. The patient died at the expiration of a month. The night before her death, a sort of whitish-yellow exudation,—an unorganized false membrane—coated, without firmly adhering to, the tongue and all the internal surface of the cheeks and mouth. The same exudation had been observed a few days before in another patient, who died from diffused phlegmon of the arm.

At the autopsy, extreme emaciation was apparent. The tumour, when cut, presented a cerebriform appearance, and there exuded from it a whitish, milky fluid, which could be taken up on the blade of the scalpel, a characteristic sign of carcinomatous degeneration. The chest being opened, the left lung appeared slightly gorged with blood; there were some old cellular adhesions on this side; the right lung was in a state of grey hepatization; a large collection of purulent matter had existed at its lower edge, against the diaphragm; there was none there now, but it was from this part that the discharge proceeded, which I thought came from the upper part; some portions of the lungs, which were less inflamed and less gorged, floated in water, the rest fell to the bottom of the vessel; on this side there were some patches of recent and unorganized false membrane.

Instead of entering the air passages, foreign bodies may become fixed in the œsophagus; in which case there are three modes of proceeding—extracting them by incision, or by the mouth, or by forcing them into the stomach.

Case VII.—*A five-franc piece fixed in the Œsophagus. Extraction. Reflections on the passage of foreign bodies through the various parts of the digestive canal.*—A young man laid a wager with some friends that he would swallow a five-franc piece. He intended to pretend to swallow it, and merely to conceal it in his mouth, but in endeavouring to do this, he actually did swallow it. It was stopped at once at the upper part of the œsophagus, and gave rise to serious disturbance, such as acute pain, attempts at vomiting, and extreme difficulty, amounting almost to impossibility, in swallowing solid or liquid food. He came to the Hôtel-Dieu on the same evening, 12th May, 1830, and was attended by M. Sanson. Some attempts were made to extract the piece with a pair of long forceps, but they were unsuccessful, and tended rather to push it farther down.

On the following day, the symptoms were aggravated rather than otherwise; the desire to vomit was constant, and the straining very painful. With Hunter's forceps I felt the piece at the level of the upper extremity of the sternum. Every endeavour to lay hold of it was, however, unavailing; and I then had recourse to another instrument which I have used with success in similar cases. It consists of a long strip of whalebone, very flexible, with a small silver extremity articulated in such a way as to admit of slight lateral movement. This appendage is six lines wide, and about the same length, conical in form, with the point downwards, and capable of passing easily between the parietes of the pharynx or of the œsophagus and the foreign body; its two sides increase in width at the upper end, and are hollowed and well adapted to lay hold of the object to be extracted. This instrument was passed into the œsophagus below the piece, and lifted it up into the pharynx and back part of the mouth, whence it was easily taken with a pair of common forceps. The only consequences to the patient were a certain amount of irritation of the œsophagus, caused by the presence of the foreign body; but these symptoms soon gave way to antiphlogistic treatment.

Bodies of such a size are not easily passed through the contracted parts of the alimentary canal and finally evacuated. It happens, however, sometimes; but under other circumstances they are arrested at some contracted part and give rise to serious lesions, finally destroying the patient.

I will narrate two cases of M. Larrey, which are worthy of notice.

A soldier, for a wager, swallowed a five-franc piece. It stuck for a few moments in the œsophagus, and caused great pain, but at last went down into the stomach. Its presence produced no ill effects, and it was evacuated per anum, twenty-one days afterwards.

Another soldier did the same thing. The piece fixed itself almost immediately above the cardiac orifice of the stomach; and the man was obliged to seek assistance in the military hospital. Larrey tried to extract it, but did not succeed. The piece kept its place, but it was so fixed as not to prevent food from passing into the stomach. The symptoms diminished gradually, but the pain and annoyance at the spot where it was fixed never ceased entirely. The patient, however, left the hospital and returned to his duty; but six months afterwards he came in again, and died of fever. At the autopsy the five-franc piece was found placed obliquely two inches above the cardiac orifice of the stomach; and at this spot there was extensive ulceration, accompanied by considerable congestion and scirrhous hardening.

The different termination of these three cases is a point of considerable interest. In one, the body was extracted; in the second, it was spontaneously expelled; whereas, in the third, it gave rise to organic lesions which contributed to the death of the patient.

In a case reported by M. Pigné, the only instrument used was the hand. A man, eating potatoes greedily, was seized with symptoms indicating that one had stuck in his throat.

A distinguished surgeon easily discovered that it was fixed in the upper part of the œsophagus. Having failed in extracting it after many attempts, the patient was sent to me; and I soon effected the object by crushing the potato with my fingers applied to the throat externally.

For a length of time there was no established practice for the extraction of foreign bodies from the œsophagus: I have given some attention to the subject, and the following is the result of my experience.

I considered that the sound might be employed for the œsophagus in the same way as it is used for the urethra. This is always necessary when the foreign body is not within reach, for, if its position be not exactly ascertained, it is impossible to bring to bear other proper means for its extraction. The instrument I use may be called an œsophageal sound, and consists of a flexible rod of silver, capable of overcoming some resistance, and about eighteen or twenty inches in length, with a ring or handle of some sort at one end, and a small spherical ball at the other. It is well to have several such instruments of different sizes, with balls varying also in diameter.

With such an instrument you can neither hurt nor irritate the œsophagus, and when it once touches the foreign body, you can easily ascertain its depth, its density, the degree of tenacity with which it is held, and the direction in which it is placed. The ball will also enable you to judge as to the size of the object and the space between it and the parietes of the passage. Further, this instrument may be used also in other cases, such as detecting the seat and extent of contractions which sometimes affect the œsophagus, and interfere with its functions.

Case VIII.—*Penny piece (gros sou) in the pharynx.*—Gauthier, aged 22, having on the 6th November, 1820, passed the evening in drinking with some companions, and having two penny pieces left, layed a wager that he would eat them. He carried this into effect at once, and swallowed one, which stuck in the pharynx, and produced retching. He tried in vain to lay hold of it with his fingers; he took an emetic, which acted powerfully, but without the desired effect, and he then came to the Hôtel-Dieu. The next morning I examined him, and extracted the body. I first used the sound which I have described above, and having introduced it into the pharynx to the depth of eight inches, I felt some resistance, and on calling the attention of the assistants, they all distinctly heard the silver ball strike against the piece of money as I moved the sound rapidly but lightly to and fro. The foreign body was placed across the pharynx, and arrested at the point where this muscular canal contracts and is continued under the name of œsophagus. I then used a pair of long forceps, slightly curved to suit the passage, and having introduced them into the pharynx, I soon laid hold of the penny, and was on the point of extracting it, when it escaped, in consequence of the patient's struggles. The next attempt was more fortunate, and the piece was soon brought forth.

the succeeding day the patient was well enough to quit the hospital, having no symptoms of irritation.

Other instruments are also used for the extraction of foreign bodies from the œsophagus, which I will enumerate but not describe, every surgeon having altered them according to his own ideas. I will not speak of the sharp-pointed hook, which is more adapted to pierce the œsophagus, than to bring up a foreign body. Stedman has successfully used this instrument, but with a blunt end instead of a point. This and similar hooks must necessarily be carried below the object to be extracted; and the same observations are applicable to the hook of Petit, &c. In some of the old surgical collections there is an instrument made like a parasol, which was passed beneath the object, then opened and withdrawn. Finally it has been proposed to use what are called œsophageal forceps, similar to those of Hunter, but longer and slightly curved. The two elastic arms of which they consist are inclosed in a silver or India-rubber tube. This is undoubtedly the most appropriate instrument, but it has these faults: it does not take firm hold of the body; it sometimes nips the sides of the œsophagus, and exposes them to laceration by the sharp projections which some foreign bodies present.

Should it be thought expedient to force the foreign body into the stomach, the best instrument, and the most easily procurable, is a long slip of whalebone, tolerably strong and flexible, with a piece of sponge well fastened to one of the ends.

SECTION IV.

ON THE TREATMENT OF GOITRE BY THE SETON.

Persons of a lymphatic habit, characterised by a soft and white skin, rounded form, and quiet habits, are more subject than others to goître. It affects women more frequently than men, children than adults. In its healthy state, the thyroid gland, which is the seat of this complaint, weighs one to two ounces; in a morbid condition it may reach to one or two pounds. It is endemic in the valleys of Savoy and the Valais, where some of us may have seen it, and is often accompanied by cretinism, and spares neither sex nor age. Travellers, stopping at the wretched villages, are surrounded in a moment by persons with goître, and cretins, whose inarticulate cries are almost wild and frightful. Such is the influence of climate, that an adult going into a country subject to goître would be exposed to the disease.

Various causes have been pointed out as determining goître. Fodéré, in the curious details which he gives in regard to places where this affection prevails, insists, perhaps too exclusively, on the humidity of the atmosphere and on temperature: he says that the inhabitants of these parts are almost always in a vapour bath. No doubt a hot and humid temperature, during a great part of the year, may have a decided action on our organs; but goître also affects persons who are differently circumstanced.

Case I.—*Large goître. Seton. Recovery.*—A woman of adult age came to the Hôtel Dieu with goître, which she had had for twelve or fifteen years. It was very large, and involved both sides of the thyroid gland. A seton was passed through each lobe, and, after continued suppuration during several months, the patient was completely cured. The cicatrices only of the setons were observable on the skin covering the thyroid gland. As to the goître, it had almost entirely disappeared. There still existed a nucleus as large as a small walnut, hard and insensible, but it remained stationary for many years.

I will enter into some details on the manner of performing this operation, and give my opinion as to this mode of treatment, and some other therapeutic agents which have been much boasted of as antidotes.

Amongst the medicinal means used in this disease, iodine has above all others been resorted to most indiscriminately; and it would appear that no goitre ought to withstand its employment.

In many cases, however, it fails; and a very little reflection would have enabled its advocates to anticipate such a result. Goître depends on different causes; sometimes it is a simple hypertrophy of the thyroid gland; at other times it is a scirrhous degeneration; and, again, it may be formed by cysts variously filled. Iodine cannot possibly act on such different affections; in fact, as I have already said, it does not succeed better, in many cases, than the powder of Sancy, burnt sponge, mercurial frictions, camphor liniments, ammoniacal or anodyne plasters, and a number of other pharmaceutical remedies which have been so much vaunted. It is but fair, however, to add, that iodine has effected some cures.

The therapeutics of goitre, therefore, present nothing but obscurity and uncertainty, notwithstanding the pompous assertions of so many authors and quacks, who pretend that they are constantly discovering new specifics, and narrate case after case of success.

To arrive at any useful result, it would be necessary to undertake a series of observations, and to begin by well establishing the nature of the disease, distinguishing those cases which are similar in outward appearance, but very different in their nature.

In the absence of such a work, it behoves every practitioner to point out such therapeutic agents as he has found successful. I will confine my remarks to the seton, which I prefer, and which I have used with advantage. Professor Quadri, of Naples, has lately boasted of this as a novelty; in which, however, he is mistaken, as I put it in practice some years ago on a patient, and with success.

Some time after the employment of the seton, the goître begins to diminish, and in a few months it is entirely dispersed; this process, indeed, sometimes continues after the seton has been withdrawn, and the wounds are healed up. It is difficult to say how the seton acts, whether by inflammation of the tissue of the thyroid gland, or by the suppurative action; but, however this may be, it is effectual.

When the seton is passed through the thyroid gland, there is always considerable loss of venous blood, which escapes with fearful impetuosity, but soon subsides. It is similar to the bleeding which takes place in the extirpation of polypus from the nasal fossæ; sometimes occasioning syncope, which, but for dashing cold water to the face, might prove fatal. This hemorrhage, which arises from the large venous plexus situated in front of the thyroid gland, is stopped by desiring the patient to breathe freely, so that the venous circulation may not be impeded, by the use of cold lotions, or by gentle pressure. The seton ought usually to remain some months to produce the desired effect; but this must, of course, depend on the progressive improvement that takes place. One precaution must not be lost sight of, namely, to bear in mind distinctly the situation of the thyroid arteries.

I cannot say of the seton, as has been maintained in regard to iodine and other specifics, that it will always cure goître. Scirrhus, for example, which at times occurs in the thyroid gland, can never be advantageously treated by such means; but hypertrophy, cysts, and hydatids, in which iodine preparations and other pretended remedies so often fail, are forms of the disease which readily yield to it. I will cite one case in which the seton was unsuccessful, which will show that though the best means are tried, they are not infallible.

Case II.—*Large goître, ineffectually treated by a seton, and by the use of iodine internally and externally.*—Josephine Charles, aged 26, unmarried, a sock-maker, short, of sanguine habit and good constitution, was an inhabitant of the village of St. Maurice, in the department of La Meuse, situated at the extreme end of a valley containing springs and stagnant water. Of 360 inhabitants of the village, 50 had goître; and, from time immemorial, the people of the valley had been subject to this disease; but there were no cretins. The mother of our patient died eleven years ago, having a large goître, from which she was suffering before the birth of

Josephine. She was the youngest of a family of eight, none of whom were affected with the disease, neither was her father. At 13½ years of age, the catamenia appeared for the first time. At 14, she was exerting her strength to carry a heavy load of wood on her head and shoulders, and a week after, she perceived an enlargement of the anterior and middle part of the neck. For a year this swelling went on increasing, chiefly on the right side. The tumour was well-defined; and, notwithstanding the application of leeches, it continued to enlarge.

At length, at the end of twelve years, the patient came to the Hôtel-Dieu. Her neck was very large, projecting forward in the median line, and more on the right side than on the left. The skin was of natural colour, showing anteriorly several large veins beneath it. The enlargement and protuberance of the neck arose from the development of a trilobed tumour, occupying the anterior and lateral regions of the neck. It could be defined by the finger on every side; and it was ascertained that it extended downwards in front of the clavicle and sternum, projecting three inches in front of the chest. Laterally it was contained within a line drawn perpendicularly from the mastoid process to the clavicle, especially on the right side; above, and in the middle, it did not rise very high, not covering the larynx; but at the sides it extended to the horizontal ramus of the lower jaw. It occupied a considerable space, being divided into three lobes; the middle one below the larynx was of the size of a small apple, and those on the sides the size of pears; that on the right side being the largest.

These three tumours were not independent of each other, but they formed one; the skin was not adherent; they were circumscribed, hard, and resisting, but less so than scirrhus; no fluctuation or pulsation could be detected, and pressure did not give pain. The two lateral tumours were crossed and covered by the sterno-mastoid muscles; they were well-defined by the finger when the patient tried to bend her head forward against an opposing force. The carotid arteries were thrown very much outwards, and their pulsation could be detected external to the sterno-mastoid muscles. In swallowing, the tumour rose a little, but this motion was scarcely perceptible. During any great effort, the veins of the neck swelled, and the tumour increased in size; the same happened at the catamenial period, which came on twice in a month, and lasted three or four days each time. There was very little inconvenience in respiration, deglutition, or digestion; the general state of health was good, the sleep regular, and the tumours gave no pain.

On the 15th of February, I passed a seton-needle through the right tumour, carrying it from within outwards, and transversely from one side of the tumour to the other; thus passing beneath the sterno-mastoid muscles, and avoiding the large veins and the carotid artery; a portion of thread was left in; very little blood was lost. The wounds were simply dressed in the evening, when pain came on in the neck and shoulder, with headache; the pulse was greatly accelerated, skin hot, excessive thirst. These symptoms were relieved by bleeding, but they returned on the following day, and were subdued by spare diet, emollient drinks, and foot-baths; very little swelling took place in the neck; suppuration began on the seventh day; the seton was dressed daily; it suppurated extensively for four months or more, but there was no diminution in the size of the goître. On the 5th of June, iodine was administered internally, in combination with iodide of potassium. A few days afterwards, the iodine ointment was rubbed on the goître. No success attended this treatment, though it was carefully followed for many months; the patient became much thinner, and left the hospital on the 6th of August, without any improvement as regards the goître.

Thus, as I have said, it would be wrong to say that the seton is efficacious in all cases; this remedy succeeds only in certain varieties of the disease. It may be conceived, however, that suppuration is an excellent means for dispersing tumours. Sometimes it excites violent inflammation, which is almost always diverted by antiphlogistic remedies; but should it happen otherwise, the seton must be withdrawn for a time. Another accident which may attend the use of the seton is arterial hemorrhage, which, however, stops of itself immediately the seton is withdrawn. It may be replaced a few days afterwards; and this simple precaution suffices to stop the hemorrhage, and to prevent its recurrence.

SECTION V.

ON PERMANENT CONTRACTION OF THE FINGERS, AND ITS CAUSES.

The cause of contraction of the fingers, and especially of the ring finger, was almost unknown until the present time. It is not a matter of surprise that it should have been regarded as incurable, when we consider the numberless causes to which it was attributed, the endless remedies that were tried, and the theories that were framed as to its origin. The authors who have treated of the subject, have done so in a very incomplete manner. M. Boyer, in his '*Traité des maladies chirurgicales,*' describes it under the name of *Crispatura tendinum,* but he says very little about it. Astley Cooper, in his work "On Dislocations and Fractures of the Joints," says, that a finger or a toe may be drawn by degrees from its normal position by the contraction of the flexor tendon and its sheath; and that, in consequence of this distortion, the first and second phalanges of the toes project upwards against the shoe, so as to prevent the patient from walking. He adds, that he has frequently seen such contractions in young women, and attributes them to the habit of wearing tight shoes. He recommends amputation of the distorted toe in such cases.

Probably, if search were made, something more might be found in books; but my life has been so entirely passed in practice, that I have not had time to go through the various works; and I shall be glad to learn that they who have preceded me, and have written on this subject, have discovered the cause and the means of cure.

These contractions have at different times been supposed to proceed from rheumatism, gout, external violence, fracture, or from the infection of some poisonous matter in the system. We shall soon see what little foundation there is for these assumed causes.

Most of those who are thus affected, have been in the habit of using force with the palm of the hand, and of handling hard bodies, such as a hammer, an oar, or a plough. Thus the wine-dealer and the coachman, whose cases I shall cite, were in the habit, the one of boring his casks with a gimlet, or piling up his casks; and the other of continually using his whip on the backs of his horses. I could also give, as an example, the case of a clerk, who used to stamp his letters with a seal, the handle of which pressed forcibly against the palm of his hand. It is found also in masons, who lay hold of stones with the ends of their fingers, also in gardeners, &c. It, however, generally attacks those who are compelled to use the palm of the hand.

The affection usually commences in the ring-finger, whence it extends to the others, especially to the little finger, and increases by almost insensible degrees. The patient at first feels a little stiffness in the palm of the hand, and a difficulty in extending the fingers, which soon become a quarter, a third, or half bent. The flexure is sometimes carried much farther, and the ungual extremities of the fingers are bent into the palm of the hand. From the very beginning a cord is felt on the palmar surface of the fingers and hand, which is drawn tighter when an effort is made to straighten the fingers, and disappears entirely when they are quite bent. It is of roundish form, and its most salient part is at the articulation of the finger with the corresponding metacarpal bone, where it forms a sort of bridge. Its extremities are lost insensibly at the second phalanx of the finger, and about the middle of the palm of the hand, or perhaps short of this point.

The skin covering the finger is thrown into arched folds, the concavity of which is below, and the convexity above. This condition is for a time limited to the finger primarily affected; but at a later period the other fingers are, though in a less degree, involved in the deformity.

Notwithstanding all these appearances of deep-seated mischief, the joints of the affected fingers show no trace of anchylosis, and, without excepting even the first phalanx, they may be easily bent; but, beyond a certain point, they cannot be straightened with any amount of effort; and I have seen one hundred to one hundred and fifty pounds weight suspended by the hook which the finger forms, without changing its position a line. It would seem as if the finger were prevented from being straightened by an inflexible barrier placed along its dorsal aspect; but there is really no other obstacle than the cord on the palmar surface of the fingers and hand, the bold prominence of which is proportioned to the efforts made to straighten the finger. The affection begins, proceeds, and reaches its climax without any pain. Even the efforts I have mentioned cause scarcely any; and it would seem to consist in some mechanical obstacle, in tissues having very few of the properties which render other parts sensible to external violence.

But how are these inconveniences to be accounted for? The ring-finger is incapable of extension, and the others will not admit of it completely; the patient, consequently, cannot lay hold of large objects; if he presses anything tightly, he experiences a sharp pain; the act of grasping is obstructed, and causes a painful sensation. When at rest there is no pain; and none is felt till he endeavours to straighten his fingers too suddenly.

I have seen thirty or forty such cases, and could cite numberless opinions on the cause of contraction of the ring-finger. Some have regarded it as due to a thickened or horny texture of the skin, not considering it as arising from any specific cause; others have thought that it depends on spasmodic affection of the muscles; but this explanation is purely hypothetical, for all the movements, excepting that of extension, are executed with perfect freedom. Many have considered that the contraction is connected with a disease of the flexor tendons, and I was of this opinion for a length of time. But I was anxious to ascertain the nature of the disease; whether it was the result of inflammation, or of abnormal adhesion of the cellular tissue, or a chronic affection of these parts. By repeated dissections I found that none of the supposed alterations existed. Some have ascribed it to a disease of the thecæ of the tendons; others to some peculiarity in the articular extremities of the phalanges and the lateral ligaments. If the articulation be examined, it will be seen that the surfaces are very extended, and that they are united in such a manner as to render the motion of flexion much easier than that of extension. The lateral ligaments on both sides of the joint present a peculiarity which is worth noticing. They are nearer to the anterior than to the posterior surface, the result of which is that the fingers have a greater tendency to bend than to straighten. But, admitting that this hypothesis is of some value, it cannot be applicable to men in the prime of life; besides, it will not stand against facts. Lastly, there are some who fancy that the contraction is owing to a disease of the articulating surfaces, which may deprive them of their polish, and lead to wear or anchylosis of the joints.

I will not dilate any further on these various opinions, and I have merely alluded to them because they are connected with the history of the disease. The important point is that an obstacle exists, and we should endeavour to discover the true cause. A very few years ago, it was thought that contraction of the ring-finger arose from an alteration in the flexor tendons; and, on looking at the projection at the anterior part of the finger, this opinion seemed plausible.

Such was the state of the question, when a man suffering from the affection died. I had watched him for some time, and I availed myself of the opportunity to seek further information.

Case I.—*Permanent contraction of the fingers. Death. Dissection.*—An old man, who had suffered for a length of time from contraction of the fingers, having died, I determined on having a careful anatomical examination of the parts; as soon as I obtained possession of the arm, I had a drawing made of it, and then proceeded to the dissection. Having removed the skin from the palm of the hand and from the palmar surface of the fingers, the folds and wrinkles which it presented previously entirely disappeared; so that it was evident that this appearance, which it assumed during the affection, did not appertain to the skin itself, but was imparted to it secondarily. Continuing the dissection, I laid bare the palmar fascia, and observed with surprise that it was in a state of tension, contracted and diminished in length; from its lower part something like cords proceeded to the sides of the affected finger. On endeavouring to extend the fingers, I clearly perceived that the fascia became still more tense; here was a ray of light, and I suspected that this tissue had something to do with the disease. But it remained to discover the affected point; I cut through the prolongations which it gave off to the sides of the fingers, and the contraction ceased instantly; the fingers became nearly straight, and a very slight effort extended the phalanges completely. The tendons remained entire, and the thecæ were not opened; all that had been done was the removal of the skin, and the section of the prolongations of the fascia which proceeded to the base of the phalanges. With the view of leaving nothing in doubt, and resolving all objections, I laid bare the tendons; they were of the natural size, and were as supple as usual, the surfaces being smooth. I then proceeded further; the articulations were in their normal state, the bones were neither enlarged nor uneven, nor did they show the least sign of alteration either externally or internally; I could perceive no change in the inclination of the articulating surfaces, no alteration in the external ligaments, no anchylosis, neither had the synovial sheaths, the cartilages, nor the synovia experienced any change. It was, therefore, natural to conclude, that the origin of the affection was in the extreme tension of the palmar fascia, and that the contraction itself resulted from injury of the fascia by the forcible and continued action of some hard body against the palm of the hand. It only remained, therefore, to apply this new theory to cases as they might occur.

The various opinions which have been given to the world as to the cause of this affection, have necessarily involved great uncertainty of treatment. Many practitioners have considered it incurable. Dr. Bennati, on consulting Astley Cooper about an Italian pianoforte player named Ferrari, who suffered from the deformity, was told by this celebrated English surgeon that it is incurable; from which it is clear that the nature of the disease was not then known to him. Others, whilst admitting the possibility of curing it, have lauded various methods, which have generally proved ineffectual. Having had many such cases under my care, I have at different times tried poultices and various emollient applications, leeches, and friction with ointments, especially mercurial; I have also tried alkaline and sulphurous douches, &c., at every temperature, but without success. I then attempted permanent extension, with the aid of an instrument made by Lacroix; but this led to no improvement, on the contrary, it gave rise to severe pain in the palm of the hand, after continuing it for some time, and it was abandoned. Some surgeons proposed section of the flexor tendons, which operation was performed twice. The first time the tendon was cut through the middle, which gave rise to inflammation and contraction along the sheath; the patient's life was endangered and the finger continued contracted. In the other case the section was made much lower; no accident followed, but the finger remained almost as much bent as before. Some time after these operations, which were performed by very good surgeons, I was consulted in a similar case.

Case II.—*Contraction of the ring and little fingers, completely cured by simple division of the palmar fascia.*—In 1811, L——, a wholesale wine-dealer, having received a great many casks of wine from the south, was assisting his workmen in stowing them away and piling them up on each other. Whilst trying to lift up one of the casks, which are usually very large, by putting his left hand below the projecting edge formed by the extremity of the staves, he felt a cracking sensation and a slight pain inside the palm of the hand. For some time the part was sensitive and stiff, but by degrees these symptoms subsided, and he thought no more of them.

He had almost forgotten the occurrence, when he perceived that the ring finger had a tendency to contract towards the palm, and was incapable of extension like the others. Not feeling any pain, he took no notice of this slight deformity; but by degrees it grew worse, and the contraction became greater every year. At the beginning of 1831, the ring and little fingers were quite bent and rested on the palm of the hand; the second phalanx was bent upon the first, and the extremity of the third was applied to the middle of the ulnar side of the palm. The little finger was much bent, and constantly directed towards the palm of the hand. The skin was puckered and dragged towards the base of the two contracted fingers.

The patient, annoyed by the increase of the distortion, and wishing to get rid of it, consulted several medical men, who all thought that the seat of the disease was in the flexor tendons of the affected fingers, and that the only remedy was a section of these parts. Some advocated the cutting of both tendons, and others of one only. M. Mailly thought likewise, that the affection arose probably from contraction of the flexor tendons, but he advised the patient to seek my opinion. Immediately I saw the hand, I was satisfied that the affection did not arise from contraction of the flexor tendons, but solely from that of the palmar fascia, and that by dividing this structure the fingers would be set at perfect liberty. The operation was appointed for the 12th June, when I proceeded in the following manner, aided by Drs. Mailly and Marx.

The patient's hand being firmly fixed, I began by making a transverse incision, six lines in extent, opposite the metacarpo-phalangeal articulation of the ring finger; the bistoury first divided the skin, and afterwards the palmar fascia with a cracking noise which was distinctly heard. When the incision was completed, the ring finger was immediately liberated, and could be extended almost as easily as in a natural state. Wishing to spare the patient the pain of another incision, I endeavoured to extend the section of the fascia, by slipping the bistoury transversely and deeply beneath the skin towards the ulnar edge of the hand, so as to disengage the little finger, but I did not succeed. I determined, in consequence, on making a fresh transverse incision opposite the articulation of the first and second phalanges of the little finger, and thus detached its extremity from the palm of the hand; but the remainder of the finger continued as before. Another incision then divided the skin and the fascia opposite the corresponding metacarpo-phalangeal articulation, which disengaged the finger in a slight degree, but the effect was incomplete. At last I made a third transverse incision opposite the middle of the first phalanx, and the finger was immediately set free; showing clearly that this last incision had included the point of insertion of the digital process of the fascia. Very little blood was lost. The wounds were dressed with dry lint, and the two fingers were kept extended by an appropriate instrument fixed on the back of the hand.

During the day and the night there was little or no pain, merely a slight inconvenience from keeping the fingers in a state of extension. On the following morning the back of the hand was rather œdematous, owing to the pressure of the instrument, which was clumsily made. On the 14th, a new instrument was applied, made by Lacroix, consisting of a semicylindrical piece of pasteboard, with four metallic branches which could be lengthened or shortened at pleasure, each having a sort of thimble at the end to receive the extremities of the fingers. At first the patient appeared relieved, but in the evening the pain returned with increased violence, and the hand became swollen all over. I did not remove the instrument, but ordered the hand to be constantly bathed with Goulard wash, by which means the pain and swelling diminished and were bearable.

On the 15th, the lint was removed, but suppuration had scarcely commenced; the hand was still swollen, with pain and tension of the extended fingers. The instrument was, however, kept on as before, and the lotion was continued. On the 16th, the swelling had subsided and there was only stiffness of the fingers; suppuration was well established. 17th, the symptoms still diminished, and the fingers were extended a few degrees more without pain. On the succeeding days the swelling and tension disappeared altogether, and the wounds were approaching towards cicatrization, though slowly, in consequence of their lips being kept apart intentionally by the forced extension of the hand. The wounds were healed by the 2d of July, closing in the following order: 1st, that which corresponded with the articulation of the first and second phalanges of the ring finger; 2d, that which was opposite the middle part of the first phalanx of the same; 3d, that which was connected with the metacarpo-phalangeal articulation of the little finger; 4th, that which was first made, and which corresponded with the metacarpo-phalangeal articulation of the ring finger. The patient continued to wear the instrument for more than a month, so as to prevent the approximation of the cut edges of the fascia, as they healed. When the instrument was removed, he was able to bend his fingers, and only felt a little stiffness from their having been kept so long in one position.

On the 2d of August, the patient wore the instrument only at night, and the joints already showed great suppleness, proving that the use of the flexor tendons was perfect, and that the fingers would return to their natural state in a short time.

The facts of the above case leave no doubt as to the cause of the affection, and fully confirm my opinion.

The following short description of the palmar fascia will show how it acts in producing these effects. The superficial portion of the fascia is derived partly from the insertion of the palmaris longus tendon, and is partly a prolongation of the anterior annular ligament of the carpus. At its commencement it is very strong, and then thins off gradually towards its lower edge, dividing into four parts, which are severally directed towards the heads of the last four metacarpal bones. Here, each of these processes bifurcates to admit of the passage of the flexor tendons, and either subdivision keeps along the sides of the phalanges, and not in front, as many anatomists have described. It is these prolongations which are more stretched than the fascia, and which require to be divided. When the skin and the fascia are dissected, there is some difficulty in separating them, owing to the cellular tissue and some fibrous prolongations which arise from the fascia. These adhesions account for the puckering and movements of the skin. In cutting through these fibrous prolongations, it might be apprehended that the nerves and vessels would be involved; but, when the fascia is in a state of tension, it forms a sort of protecting arch across them, so that it may be cut without any danger. The use of the palmar fascia is to support the tendons of the flexor muscles, to preserve the palmar arch, and generally to protect the various parts of the hand. In roosting birds it is very largely developed, and is remarkably elastic. Such are the functions usually attributed to the palmar fascia, but it has others, whereby it tends to keep the fingers semiflexed, which is their natural position in a state of repose; and this function, when exaggerated by disease, produces contraction of the fingers.

This contraction, especially of the ring finger, is therefore an affection, of which the cause is now ascertained, as well as the method of treatment.

Case III.—*Contraction of the fingers. Operation.*—A man named Demartan, a coachman, aged about 40, came to the hospital early in December. For some years past he had perceived his fingers incline towards the palm of the hand, especially the ring finger. When he came to be examined, the fingers were not more than an inch and a half from the palm, the skin of which was in creases with their concavity towards the fingers. In extending the phalanges, a sort of cord was seen, stretching from the finger to the palm of the hand; and both hands were similarly affected. The diagnosis was clear. When the patient moved his fingers, the tension of the fascia was manifest.

Having put on the stretch this shortened portion of the fascia, I made two semicircular incisions with a curved bistoury; one at the base of the ring finger, so as cut through the two lateral prolongations of the fascia belonging to this finger; the other an inch and a quarter below the first, in the palm of the hand, in order to make a second section of this digital prolongation, and to separate its base from the palmar portion of the fascia. As soon as these incisions were completed, the ring finger almost immediately assumed its natural position. Very little blood was lost. The patient being weak, the operation on the other hand was postponed. The dressings were the same as those used in the preceding case. On the 10th January, the patient was quite well; the wounds had healed, and the fingers were perfectly straight and extended.

These cases prove incontestably that contraction of the fingers arises from a shortening of the palmar fascia, and more especially of the prolongations which it gives off at the base of the fingers; as also that the affection may be cured by a section across these prolongations and that part of the fascia from which they proceed.

Three cases are not sufficient to establish a maxim, but they will scarcely fail to attract the attention of practitioners, and by these means do good service to science and humanity, in the multiplication of observations on the causes, symptoms, effects and treatment of this affection, and principally with reference to the operation which I have proposed for its cure. I wish for such observations with all my heart, whether for or against my theory; for I desire above all to be useful in the cause to which I have devoted myself. But it must be well understood that cases which may have some analogy are not always the same; and that the best remedies may fail by their wrong application; such, for example, as the use of my operation in contractions of the fingers arising from rheumatism, gout, or paronychia, &c.

I repeat that this affection may proceed from many different causes, and that the same remedy is not applicable to all; for it is evident that if contraction of the palmar fascia were not distinguished from abnormal changes in the tendons, a serious error might be committed.

To enable the reader to establish a differential diagnosis of the various diseases which might be improperly attributed to this affection of the palmar fascia, I will give some account of several cases in which permanent flexion of the fingers occurred from other causes. The first is that of an old porter, aged 74, who has been for some years a street sweeper. Five or six years ago the palm of his hand was injured by a piece of wood, and two years ago he observed that the middle and ring fingers of his right hand began to contract, since which time the contraction has made rapid progress. He referred it to cold from which he suffered during a severe winter. Now the fingers are about one quarter bent, and it is impossible to straighten them by any exertion or force. Two hard projecting cords proceed from the palm of the hand to the base of the contracted fingers. When an effort is made to straighten them, these cords become more salient, and the tendon of the palmaris longus muscle is seen to move, and to become extended all along the lower part of the fore-arm. I have selected this case of true contraction, so that the existence of its characteristic sigu may enable you to distinguish between this and other similar affections.

In other cases, one or more fingers may be bent towards the hand without any contraction of the fascia. This disposition of the parts may then result from alteration of the phalanges, as you will observe in the two following cases.

Case IV.—*Alteration of the phalanges. Contraction.*—A boy, about 14 years of age, lately came to the hospital with a white swelling in the ankle-joint. On examining him, it was found that the little finger of his left hand was contracted, and had been so from childhood. The finger was curved in a half-circle; the first phalanx was immovable on the second, and the second on the third; but the articulation of the first phalanx with the fifth metacarpal bone was perfectly free. It could be bent backwards, as in its natural state. When these motions were attempted, no cord was seen in the palm of the hand towards the base of the finger; therefore, in this case, there was an affection of the phalanges, and not of the palmar fascia.

The other case presented exactly the same symptoms; and thus, in both, the absence of the cord, the free motion in every direction of the metacarpo-phalangeal joint, the immobility of the second phalanx on the first, and of the third on the second, are distinguishing marks of the disease, which was anchylosis of these articulations.

A cicatrix resulting from a wound may be mistaken for the cord; but it is superficial, and, besides, the cause was apparent.

CASE V.—In this case, the last two fingers were constantly bent towards the palm of the hand; they could, however, be readily extended, and there was no cord; all the articulations were perfectly free. The patient had received a sabre-cut on the back of the hand, which had divided the extensor tendons of the two fingers: the divided ends not having reunited, the flexors having no antagonists, kept the fingers constantly applied to the palm of the hand. In this case, therefore, there was no contraction, but a passive flexion of the fingers, in consequence of the section of the extensor tendons.

CASE VI.—*Contraction of the ring-finger by the destruction of its extensor. Useless section of the flexor.*—P. Ballon, aged 42, received a gun-shot wound near the fourth metacarpal bone of the right hand, which injured the back of the hand superficially, completely divided the flexor-tendon of the ring-finger, and ever afterwards prevented its extension. Some time after the wound was healed, the finger was firmly fixed to the palm of the hand; and three years subsequently the patient was desirous of getting rid of the finger, which was always in his way, whether he was using his hand open or shut.

On his entering the hospital, the palmar surface of the bent finger nearly touched the palm of the hand; the point of principal flexion was at the articulation of the first and second phalanges, this joint appearing to be almost soldered skin on the palmar surface of the finger was contracted, and kept the finger firm against any force used to straighten it. At the same time, a sharp pain and a dragging sensation were felt at the upper and anterior part of the fore-arm, in the mass of the flexor muscles.

The patient was desirous of having the finger amputated, and it was about being done, when some one proposed to divide the flexor tendons; and this idea was adopted, without reflecting that, even supposing the finger could be straightened, which was extremely doubtful, the contraction of the skin, the action of the lateral ligaments, and the inclination of the articular surfaces, which always favour flexion, would conjointly prevent the finger from being otherwise than useless.

A section of the flexor tendons was made, by plunging a bistoury through the integuments near the body of the first phalanx, directing the cutting edge of the instrument towards the tendons. The finger was then straightened, but not without an effort; and, in doing this, the skin of the palm of the hand was torn, and a noise was heard, arising from breaking through the false anchylosis of the joint. The finger was kept extended by means of a splint, but this was soon abandoned in consequence of inflammatory symptoms. It was then fastened to the adjoining finger; but, so far from this succeeding, the relatively greater strength of the flexors caused the sound finger to carry with it the diseased one into a state of flexion. The patient left the hospital after some time, with his finger rather less bent, and with a little more power of motion.

A contused wound, again, may produce similar results; which happened in the following case.

Case VII.—*Contused wound, giving rise to contraction of the finger.*—This person was affected with contraction of the little finger, which was curved like an arch; all the other articulations were free, as well as that uniting the first phalanx with the fifth metacarpal; there was no cord in the palm of the hand; the flexor and extensor tendons of the finger were sound. The contraction in this case arose from a disease of the skin, which was destroyed throughout the whole extent of the palm of the hand, in consequence of a contused wound occasioned by the wheel of a carriage. The healing of this wound took place by bringing together the edges, instead of by the production of new skin; whence resulted a cicatrix, which prevented the straightening of the little finger.

Burns in the palm of the hand often produce the same effect, when not properly treated; that is, when the edges of the wound are kept in contact, instead of being separated, so as to admit of the generation of new skin to replace that which had been lost. Adhesions thus take place, which are obstacles to free motion, and produce contractions; but in this case there was no cord to be felt or seen in the palm of the hand.

Case VIII.—*Contraction of the middle finger occasioned by a burn. Incision. Recovery.*—A little girl, aged 4, named Granjot, came to me on 19th August, 1833. Her right middle finger was half bent; she was able to flex it entirely, but not to straighten it; for it was held by a strong rigid band along the middle of the finger, from its second phalanx to the upper third of the palm of the hand. It was narrow and very sharp at the finger, increasing in width towards the palm of the hand, where it felt like a very hard cord. The skin was much raised by it, especially about the joints. The metacarpo-phalangeal articulation resembled an arch, and the band in question was the cord of the arc. In the course of the latter were cicatrices of burns.

From these signs it was easy to recognize a contraction of the palmar fascia; and, in fact, it was ascertained that at sixteen months old the child had been burnt by placing her hand on a hot saucepan. In consequence of improper treatment, the finger became more and more contracted as the wound healed.

I proposed an operation that would restore the finger to its natural state. Five incisions were made successively along the course of the band, at the articulations of the finger, and at the folds in the palm; they were made obliquely, so that the wounds should gape less, through the whole thickness of the fold, and the finger could be immediately extended without violence being used.

To keep the finger in an extended position, a splint of suitable form was fixed on the dorsal surface of the fore-arm and finger, lined with wool; this was fastened to the fore-arm by a bandage, and a pad of lint was placed behind the metacarpo-phalangeal articulation. The end of the finger, held by two or three turns of a narrow bandage, was fixed to the splint, which was proportionately narrow at this extremity, and the finger was thus bent backwards. The wounds were covered with lint, on which was placed a small concave pasteboard splint, so as to fit the convex position into which the finger was forced. The whole was supported by a roller.

The wounds did not suppurate perceptibly, but their edges were encrusted with a sero-fibrinous exudation.

The wounds closed after two weeks of the same dressing daily, and the finger remained straight without any support. A week afterwards the cicatrices were complete, though still rather tender; and the child could bend and straighten the finger with tolerable ease.

Contractions are frequently acquired in certain occupations; arising from deformity of the articular surfaces of the phalanges. Thus, women who are employed in knitting, keep the little finger curved and separated from the others for a length of time, which frequently leads to contraction of this finger, arising from deformity of the articulations of the first and second phalanges. This is not so common now as it used to be, but it is said to occur frequently in Germany, where the women walk about with their knitting.

Case IX.—*Deformity of the articulations. Contraction of the four fingers.*—A strong young girl, a lace-maker, was lately sent to me, having the four fingers of both hands contracted towards the palm. They were bent in about a quarter of a circle; but the metacarpo-phalangeal articulations were quite free. They could be freely bent backwards, and when so moved there was no cord or projection of any sort. This was not the case at the junction of the second with the first phalanges, which could not be straightened, owing to some insuperable obstacle arising from a deformity of the articular surfaces of the extremities of the first and second phalanges, which was no doubt produced by the nature of her occupation.

The next is a case quite distinct from an affection of the palmar fascia. The patient was a tailor, and we are aware that, when at work, they hold the little finger bent and apart from the others to catch the thread. The patient could not extend the ring-finger, and he felt great pain in attempting to do so; but there was nothing to indicate any lesion in the palm of the hand. The mischief was in the articulation of the second with the third phalanx, where there existed a serous tumour of the kind called accidental synovial cysts; the nature of this affection is easily ascertained; therefore it is impossible to confound this form of contraction of the finger with that produced by other causes.

Contractions of the fingers arising from injury of the flexor tendons might, at first sight, be mistaken for true fascial contractions; but in the latter the projecting cord formed by the fascia is much more superficial, and does not yield to any extending force which can be employed.

Case X.—*Injury of one of the flexor tendons. Contraction.*—This is a case of contraction of the middle finger, which was bent in a half-circle. Along the whole length of the finger there was a cutaneous cicatrix, beneath which was felt a hard, round, resisting cord; which was the tendon. The patient had had a whitlow, and the surgeon had cut deeply into the middle finger, laying open the sheath of the tendon in its whole length, whence resulted the contraction of the finger.

Another case is that of a young man about 20, a law-student, having the four fingers of both hands contracted, though the thumb was quite free. The fingers were half bent, and no force could straighten them. Four hard, projecting cords existed in the palm of the hand, from the middle to the base of the fingers.

This young man attributed the affection to the negligence of his nurse, in not having opened the hands and straightened the fingers. This absurd idea shows, at least, that it was of long standing, and might possibly have been congenital. The palmar aponeurosis might have been too short for the office it had to fulfil, and thus have given rise to contraction of the fingers.

Injury to a joint is, again, another of the numerous causes of contraction.

Case XI.—*Contraction occasioned by injury of a joint.*—This case presented permanent flexion of the right fore-finger, which, from the articulation of the third with the second phalanx, was strongly inclined towards the palm of the hand. There was no motion whatever in this joint, anchylosis being completely established. The patient had received a blow, from a sharp instrument, on the back of the finger, which penetrated into the joint; inflammation and suppuration ensued, and anchylosis was the consequence. The other joints were quite free.

I will cite one more case. An engraver, in May, 1831, received a pistol-shot, which penetrated the upper and inner part of the fore-arm, the ball passing through the flesh without touching the bones. The ulnar nerve was divided, and this was immediately followed by paralysis of the inner part of the fore-arm, and of the last two fingers of the hand, to which this nerve is distributed. Having been called in immediately, I enlarged the wounds to prevent any sort of strangulation, and placed a simple dressing on. No accident occurred, and in a month he was quite well. But the paralysis remained, and was accompanied by contraction of the last two fingers towards the palm of the hand, on which they rested. The articulations of the fingers and phalanges were quite free; but, on attempting to extend them, there was great resistance; the patient felt great pain and considerable tension at the cicatrix. The flexor muscles had suffered considerable loss of substance, and were shortened, thus determining a permanent and marked flexure of the last two fingers. The same effects were seen in a patient who came to the Hôtel-Dieu, in January, 1832. The wheel of a heavily-laden cart had passed over the anterior surface of the fore-arm, and lacerated the flexor muscles; which occasioned permanent flexion of the fingers.

The lesion under consideration may arise from a bridle on the back of the hand.

Case XII.—*Contraction of the left middle-finger by a bridle on the back of the hand. Operation. Recovery.*—Josephine Lecor, a healthy child, 4 years old, had been affected, for two years, with contraction of the left middle-finger, which so greatly interfered with the motions of the hand, that the parents of the child brought her to the hospital on the 7th of July, 1833. There was permanent flexion of the four fingers, which prevented their entire extension,—not very perceptible in the fore, ring, and little fingers, but considerable in the middle one; the latter was bent forwards, almost at a right angle from the articulation of the first with the second phalanx, and backwards, at the articulation of the first phalanx with the third metacarpal bone, almost forming the letter Z; the first phalanx representing the middle portion of the letter.

This angular distortion was so decided, that it required an effort to bring every part of the finger to rest on a horizontal plane. The hand also appeared to have an inclination backwards from the radio-carpal articulation, towards the dorsal surface of the fore-arm. The cause appeared to be at the back of the hand, where there was a hard, rigid bridle, stretched like the cord of an arc, and formed by the skin, which appeared to cover some resisting body; this had arisen from the opening of a small abscess at the back of the hand. The first effect had evidently been to drag and force the hand, to an unnatural extent, towards the dorsal surface of the fore-arm, involving the extension of the phalanges on the metacarpal bones; whence it happened that the hand was not in an uniform plane, but convex anteriorly; and the flexor tendons, being obliged to pass over this return pulley (represented by the projection of the upper surface of the carpal bones), had been dragged and stretched.

This dragging of the flexors, which are inserted into the last phalanges, had determined the flexion of the latter only, because the hand and the first phalanges were subjected to a greater antagonistic force,—namely, that of the accidental bridle, in addition to the force of the extensors, the vicious contraction of which had become, from habit, permanent.

The only means by which the hand could be restored to its natural state was, to cut the bridle which had produced and kept up the deformity. On the 9th of July, the operation was performed as follows. An incision, about an inch in length, was made through the skin, parallel to the bridle; its dense, fibrous tissue, thus laid bare, was cut across; the ligamentous adhesions to the corresponding extensor tendon were carefully divided; and there remained only a simple wound, which was brought together by strapping. But this alone would, in all walked on the points of the toes, and he escaped the conscription in consequence; but of late years the position is slightly altered, and he treads on a broader surface. These three persons are able to take long walks without fatigue, but there is something rather awkward in their gait. The deformity was congenital.

Sometimes these contractions of the toes have made it necessary to resort to amputation; but this operation often gives rise to serious consequences.

Case XIII.—*Contraction of the second toe. Amputation. Recovery.*—On the 15th of April, 1833, a tanner, named Cotte, aged 39, came to the Hôtel-Dieu. For twenty-four years, the second toe of his left foot had been contracted in such a way, that the last two phalanges were bent almost at right angles on the first. He said that, whilst running barefoot, at 12 years of age, he stumbled against a stone, and split the nail of the toe in question; that the pain was sharp at the moment, but not sufficient to stop his running. From that time he had observed the toe gradually becoming contracted. At first, he was able, with some trouble, to bring it into its natural position; but he was afterwards unable to straighten it, and it became so troublesome to him, that he was anxious to get rid of it; for which purpose he came to the Hôtel-Dieu, and the operation was performed on the 22d of April.

Until lately, it was usual, in such cases, to divide the tendons and the aponeurosis of the toe, or else to amputate it at its junction with the metacarpal bones. Such operations often led to the most serious consequences, and sometimes were even fatal. Having observed that only the last two phalanges were generally much curved, and that the first was so placed as not to press against either the sole or the upper-leather of the shoe, I so far modified the operation as to take off only the last two phalanges; by which means the end was obtained with less risk. The remaining phalanx ranged very well with the others; and the wound having healed favorably, the patient returned to his usual occupations in a few days.

SECTION VI.

ON THE GROWTH OF THE TOE-NAIL INTO THE FLESH.

I have often been struck with the frequent occurrence of distortion of the nail of the great toe, and with its reproduction, notwithstanding all the means adopted to prevent it. Convinced that it was necessary to study the causes which gave rise to it, that it might be successfully treated, I examined every patient having this deformity, and soon discovered that there were two distinct varieties which require very different handling.

Before I say more, I will enter into a few anatomical particulars, which appear to me indispensable. And first we must understand what is meant by the word *nail*; whether it is the horny epidermic production which, under the form of hard, oblong plates, covers the dorsal extremity of the fingers and toes, independently of the soft parts to which they adhere; or whether we are, according to some anatomists, to consider the subjacent modified dermis as forming part of the nail properly so called; in a word, whether we are speaking of the secreted organ only, or of the secreting apparatus joined with it. This distinction is essential; for in the first case we cannot talk of diseases of the nail, as the nail cannot be diseased, a state of disease implying a state of organization; in the second case, the expression would be perfectly correct. To prevent all misconception, I will give you my reasons for adopting the first opinion. It appears to me that two objects so different should not be confounded, and that the matrix of the nail is no more the nail, than the bulb of the hair is the hair itself. This being established, let us examine the nail in all its bearings. Every one must know that it consists of three parts: 1st, the root or posterior part; 2d, the body or middle part; 3d, the free extremity or anterior part; and two surfaces, internal and external; the mention of these divisions is sufficient, but what is of more importance is to know the relation which the nail bears to the surrounding skin.

Supposing the skin to be stretched, and the lower part of the nail to be pushed backwards so as to be fixed in the skin, it is evident that the latter would be folded back on itself, and would present a concave, thin, semilunar edge; and the nail at the upper part and the sides would be comprised within the two folds of this envelope; whilst its internal surface would adhere to the skin, and its exterior be free. From this it appears that the connexion of the nail is only with the epidermis, which follows the folds and sinuosities of the true skin which it covers. Properly speaking, therefore, the nail is but a portion of the epidermis, thicker than the rest, and capable of being detached from the skin beneath.

If the nail and its subjacent dermis be examined, it will be observed that they have no connection with each other, but that the dermis, softer and more vascular than in other parts, is furnished at its upper part with longitudinal fibres, which are in relation with the longitudinal fibres of the thickened epidermis; so that, in accordance with the ingenious idea of Meckel, the fibres of the dermis may be compared to the tactile papillæ, and the lower and internal surface of the nail to the mucous plexus of Malpighi. In regard to the hard, horny portion, there is nothing remarkable to observe, except its entirely inorganic nature, and its complete resemblance to the epidermis, of which it forms a part.

Considering that portion of the skin into which the nail is fixed to be the producing organ, I have called it the *matrix of the nail.* I have directed the attention of practitioners to the inflammation of this part; and having carefully distinguished between this and the disease known as *in-growing nail,* I have proposed the best means for curing both.

I have observed above that the nail itself cannot be diseased, the morbid condition being only due to the surrounding skin; but as it generally happens that any affection of the nail arises from disease of the skin, people have stumbled at this, and have mistaken the effect for the cause. It is a matter of astonishment that so little attention has been paid by authors to the history of these diseases; though the horrid pain which they inflict, and the difficulty in curing them, should have made them a subject of peculiar attention and research.

The morbid affections of the skin surrounding the nails are always of an inflammatory character; but the inflammation may vary in its nature and its results according to the variety of the morbid causes. Thus, the cause is sometimes organic, at other times it is inorganic.

In the first case, it may happen that the external cause has acted directly and specially on the nail, and that the latter, from some physical change, either in its substance, form, or direction, may have effected a change in the skin to which it adheres: it would then seem to be a disease of the nail; but this does not signify, for as long as the skin is not involved, there cannot exist any disease; for this only commences with the affection of the skin, at which period pain and other characteristic signs of inflammation are developed.

In the second case, also, the disease sometimes seems to begin by an affection of the nail; but it is clear then that the nail is involved only in consequence of some modification or vicious secretion of the skin; thus the skin is first affected, the nail follows, and then the surrounding integument. But if it be true (and it seems incontestable), that in all these different cases there exists but one disease, namely, inflammation of the skin connected with the nail, the signs of the disease, as well as its treatment, must be very different according to the particular seat and intensity of the inflammation. Clinical observations have here been of the greatest use, and have established a well-marked distinction between the various affections of the skin and the nails; depending on their seat either at the extremities or sides of the toes, or at the posterior fold from which the nail takes its origin; or on the question whether the disease proceeds from the action of the affected nail on the surrounding flesh, or whether it has commenced by inflammation of the matrix. We will now consider cases of the first kind.

The nail may, as I have already said, be altered in its form, substance, or direction, and the affection may depend on an external cause acting specially upon it, or on some derangement in the functions of the secreting integument; and this derangement may be due to organic or inorganic causes.

Whenever the nail is affected, it always happens, as a consequence of its conformation, that it is distorted, and that it forces itself into the flesh; this disease is known by various names, but I prefer calling it *the in-growing nail*,[1] a disease with which authors have confounded other morbid affections of the skin and nails.

This disease never occurs in the hands, and is usually confined to the great toe; but sometimes, though rarely, the other toes are affected. If the conformation of the nail be borne in mind, its flattened body, the direction of the angles, and its situation in the skin which surrounds and covers it, it may readily be conceived that a tight or ill-made shoe will force the angles into the skin; and this will be done the more easily, as the skin itself is pushed outwards and upwards, so as partly to cover the nail. This irritation is increased by walking, and very painful inflammation is the consequence. Such is the ordinary cause of in-growing nail on the inner edge of the great toe.

It has been imagined that the custom of cutting the nail round has contributed to the production of this affection. M. Brachet, of Lyons, attributes it to the pressure of the flesh, whilst standing or walking, against the angles of the nail, which irritate and penetrate into it. M. Patissier, considering that the lower orders, who usually wear large shoes, and do not cut their nails either round or square, are more peculiarly subject to this disease, thinks it arises from their neglect to cut their nails at all; the nails, having thus attained a great length, bend over and inwards, and becoming strong, solid and resisting, they proceed in the same direction without opposition. And he adds that the fact of the inner edge being more frequently affected than the outer, may be due to the habit of leaning more on one side of the foot in walking; and that the fact of the great toe being most frequently affected is due to the much freer movement of that toe during exercise. It may arise also from the too great convexity or thickness of the nail, which, instead of yielding to pressure and becoming flat, exercises a resisting force, and inserts its angles into the surrounding tissues. All these causes may combine at the same time, and it is seldom that any one exists alone.

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[1] ['Incarnation de l'Ongle,' will scarcely admit of being literally Anglicised.—T.]

It generally begins at the point where the anterior joins the lateral edge. This appears to arise from the fleshy cushion interfering with the scissors in cutting the nails, so that the person stops without finishing off the angle. This allows the nail to go on growing, and it soon forms a sharp point, which pierces and injures the skin, exciting ulceration, which soon extends along the whole side of the nail. On removing nails, this sharp point is generally found to have been the exciting cause. Having pointed out the causes productive of the first variety of the disease, let us now proceed to consider its progress.

The pain is very great as soon as the nail has injured the flesh, and it is a severe task to walk or even to stand. A serous, or sero-purulent oozing takes place at the affected part, and if the patient tries to walk, the whole foot becomes swollen. The pain continues to increase, the oozing is more abundant; the sanious pus which is discharged is the more fetid, as it mingles with the perspiration of the feet. The patient, racked with pain, tries to raise up the nail, and to cut it back, from which he sometimes derives a temporary relief; but, far from effecting a cure, this proceeding may increase the difficulty of the ultimate treatment. If left to itself, the ulcer will sometimes degenerate into a cancerous sore, or become the seat of large fungoid excrescences; and at times the inflammation extends to the periosteum, giving rise to caries and necrosis of one or more of the phalanges. This affection is occasionally mistaken for other diseases.

Case I.—*Nail growing into the flesh. Division of the nail. Avulsion. Recovery.*—The Marquis of C— had been suffering for more than eight years from pain in his great toe, and had consulted several medical men, who all told him it was a gouty affection. Having exhausted all the known specifics for this disease, without any effect, and being unable to walk, he consulted me; I discovered at once that it arose from the nail growing into the flesh, and that the removal of the exciting cause would effect a cure. The patient could scarcely be brought to believe that he had not the gout, having been for eight years under this persuasion; but at length he consented to have the operation performed. The nail was divided in two, by a cut of a pair of scissors, and each portion was torn away with the dissecting forceps. A simple dressing was applied, and in a few days the patient had quite recovered, and got rid of his gout and all the remedies he had been in the habit of using.

When left to itself, it is incurable; on the contrary, it generally gets worse. Besides the intolerable pain, it may give rise to complications which prudence and experience should induce one to endeavour to prevent.

Several methods of treatment have been at various times proposed. That of Albucasis and Paulus Ægineta[1] has been cited by authors; it consists in raising the nail with a probe, cutting away the fungous growths, and burning away the rest with caustic. They also allude to the treatment of Aquapendente and of Fabricius, who used a spatula to lift up the nail, placing a small roll of dry lint between the nail and the fleshy part of the toe, so as to press down the flesh from the nail, and to admit of the free edge of the latter extricating itself, and being afterwards cut away.

Of all the means adopted, that of Desault is best known. He proposed to keep the nail separated from the flesh, so that both cause and effect might cease to exist, and he adopted a modification of Fabricius's process. Desault suggested the introduction of a small plate of tin beneath the edge of the in-growing nail, about an inch and a half long, and three or four lines broad, so that the flesh might be pressed down below its ordinary level, and the nail be raised. The pulp of the toe was covered with a cushion of lint and cerate, and this dressing was kept on by a small bandage. The dressing was renewed every third day, and at the same time the foot was bathed with some emollient decoction. The flesh by degrees became more depressed, and admitted of the nail growing over it; the dressing then became less painful, and when the edge of the nail was quite clear of the flesh, the cure was considered effectual. In Desault's *Journal de Chirurgie*, the case of a young girl is cited, who was cured in a month by this method. Since Desault's time it has been proposed to substitute a plate of lead instead of tin; but this cannot be done, at least in the early stage of treatment, as the lead does not offer sufficient resistance, but bends and is not easily introduced beneath the nail; at best it can be used only towards the end of the treatment. However this may be, Desault's process is far from proving so effectual as it was once thought to be. Not to mention the excessive pain which the early part of the process inflicts, and which is repeated at each dressing, it is very often found necessary to keep the patient under treatment for two, three, or even more than six months; at times it fails altogether, and in any case it operates seriously by extreme pressure on the already irritated tissues. It is the method, however, generally adopted by practitioners.

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[1] See Vol. II, p. 414 of the Society's 'Translation.' (T.)

M. Guilmot, attributing the distortion to the pressure of the shoe on the inner angle of the upper edge of the nail, has proposed to pare away this angle, from the middle of the free edge to the same point of the inner edge, and to cut the rest of the nail very short. He observes that, in some cases, it is necessary only to cut the nail as close as possible in the direction pointed out. If the nail should adhere very closely to the pulp of the toe, the foot should first be well soaked in a bath, the nail should be gently raised up with a spatula, and cut away as far as may be necessary. This must be repeated frequently; and it is recommended to wear a rather long shoe, fitting tight over the metatarsus, to prevent the great toe being driven to the end. By such means M. Guilmot cured himself of an ingrowing nail which had given him pain for a space of fifteen years; and he has cited other successful cases; but, notwithstanding, this proceeding must be generally considered rather as palliative than curative.

M. Brachet has also tried a new mode of treatment, and has been successful in fifteen cases. It consists in cutting away all the flesh which overgrows the nail; and he gives the following account of the operation: "I make two stages of the operation; at first, the patient's foot being held by an assistant on my knee, I take hold of the end of the toe with my left hand, and plunge a bistoury vertically outside the turn of the nail, between it and the outgrowing flesh, across from the dorsal to the plantar surface; then bringing the bistoury backwards and outwards, I form a flap, free posteriorly, but fixed anteriorly by its base. At the second part of the operation, I lay hold of this flap with the forceps, and turning forward the cutting edge of the bistoury, I carry it all along the edge of the nail, and remove at one cut the whole of the flesh beyond it. There remains only a small wound, from which there is little loss of blood; the inflammation is trifling; healthy suppuration goes on for a few days, and a firm cicatrization takes place, which admits of walking to any extent without any fear of a relapse."

M. Sommé, a surgeon at Antwerp, has proposed to cut off that portion of the nail which has grown into the flesh, and then to fill the cavity with powdered alum, so as to dry up the bottom of the ulcer, and to prevent the further growth of the nail.

M. Blaquière's practice is as follows: he begins by thinning a half or a third of the nail on the affected side, and then makes an incision from the base towards the free edge, and tears off all the part which has grown into the flesh; he then dresses the wound with lint steeped in tincture of myrrh and aloes, until it is covered by a firm, thick, and almost insensible cicatrix, upon which he directs the new growth of the nail by slipping beneath its edge a pledget of lint, which keeps it separate from the flesh, and prevents its growing in again. M. Blaquière has succeeded thus in curing some of the worst cases.

Astley Cooper recommends thinning the nail as much as possible with a bistoury, and introducing a small roll of lint beneath the part disengaged from the flesh; when active inflammation, however, prevents the introduction of the lint, he tears off the nail with forceps.

I have here given an account of various processes, all having in view the same object, namely, to disengage the nail from the flesh, and to give it a new direction; some removing a portion of the nail, others part of the flesh; but it is evident that these means can only be palliative, and are often altogether unsuccessful.

If the flesh growing laterally beyond the nail be destroyed, it is partially reproduced, and if ever so little should remain, it will spread in walking and form a ridge against the nail, which, growing still in the same direction, will find its way into the flesh. For, it must be observed that M. Brachet, who recommends this process, maintains it only under the idea that the injury is occasioned by the pressure of the pulp of the toe on the side of the nail, whence he deduces the necessity of removing the overlapping part. But it appears to me that M. Brachet is wrong, as every one is subject to this pressure, and yet very few receive any injury; we constantly see people who turn their toes in, and who would consequently exercise this pressure with increased force; but are they more subject than others to in-growing nail? Not at all. The cause of the mischief is in the conformation of the nail, and the direction which it takes in consequence; it is the nail that must be attacked, otherwise it will always be lying in wait for an opportunity to do mischief. If, instead of cutting off the surplus flesh, a portion of the nail be removed, all may go on well for a time; but if it be allowed to grow as before, it will again assume a distorted direction. It is true that the growth and direction may be watched, but all the care that can be given will very rarely succeed. Desault's process of inserting a small plate of tin, at first sight seems good; but on reflection it must be admitted that the object will not thereby be permanently attained. What is to become of the lateral growth of the nail which has been forced beyond the flesh? It will always have a tendency to bend in upon itself, and whether it be cut level with the flesh, or be permitted to overgrow it on the side, it will frequently happen that it will again make its way into the flesh. It may perhaps be asked, how is it then that these methods have been successful? Whenever the determining cause is the pure effect of accident, and not of the structure of the nail, the success of these means will depend on the early treatment or otherwise of the case. For example, suppose a well-formed nail to be injured by a tight shoe, or some external violence, if Desault's process be tried a few days after the flesh has been pierced, it is pretty certain that the inflammation will not have proceeded to such a length as to be much augmented by the artificial pressure; and the nail being turned aside, there is no reason why the disease should return. But, I repeat, whenever the cause of the injury is in the nail itself, all these means will most commonly be useless.

Being struck by these disadvantages, and having in view the cause of the mischief, I came to a decision a long time ago, that it was preferable to remove the nail altogether. This operation had already been frequently performed by many surgeons, but not very skilfully. They laid hold of the anterior edge of the nail with a pair of forceps, which were kept together by a ring, to ensure a firmer hold, and by a strong pull the nail was torn away. But, independently of the extreme pain which such a barbarous process inflicted on the patient, it happened not unfrequently that either the forceps slipped from their hold, or the portion held by the forceps was broken off, leaving the rest, so that the patient was horribly tortured in vain.

This is the way I proceed: when the inflammation of the part has been subdued by the application of emollients for some days, and when I think it a favorable time for the operation, I pass the point of a pair of straight, strong, sharp scissors under the middle of the free edge of the nail, and slip it quickly up to the root, dividing the nail at one cut into two equal parts; then laying hold of the affected side with a pair of dissecting forceps, I tear it off, turning it back upon itself from within outwards; and I do the same with the other side should it be necessary. When the fungous flesh near the wound is too much raised, I cauterize it, and thus ensure a cure as far as possible. After the operation, the skin beneath the nail dries up, the ulceration decreases and cicatrizes in four and twenty or eight and forty hours; so that in five or six days the patient will be able to walk as usual. The nail seldom grows again in old people, but it sometimes does in young ones.

At first sight, it might be thought that this operation is very painful; but the patients rarely cry out. When the nail has been entirely removed, there is no return of the disease, but it may re-appear if any portion remain behind.

Case II.—*Nail growing into the flesh. Extirpation of the external half.* R. S., aged 16, of robust habit, entered the Hôtel-Dieu, on the 18th June, 1821. For six months he had worn shoes thicker and tighter than usual, and his feet were so squeezed that he limped in walking; the outer angle of the right great toe-nail was bent inwards, and driven into the flesh, which swelled up and covered it. Redness and pain came on, and the lameness increased. The soft part being jammed by the outer toes, and compressed in every way by the shoes, became hard, callous and whitish, with a fissure in which the nail was fixed. Although suffering much the patient continued his usual occupations, until a small suppurating wound, at times also discharging blood, made its appearance, when he came to the Hôtel-Dieu.

On the 3rd of July, after a few days' rest, some baths, and emollient applications, I operated upon him. I divided the nail in the middle, from the free extremity to the root, with a pair of strong straight scissors; I then laid hold of the outer half, and, turning it back, tore it off with dissecting forceps; I also pared off the callosity, which covered it, with a pair of scissors. There was but little bleeding. The wound was dressed with cerate, lint, a compress, and a bandage.

On the 4th, 5th, and 6th, he went on well, with the same dressing, and a spare diet. On the 7th, the wound was healed, and the patient left the hospital cured, and walked well; but he was cautioned to wear larger shoes, and to wrap the toe in a piece of linen with ointment.

Case III.—*Extirpation of the nail growing into the flesh. Cautery to fungous growths.* About the end of February, 1812, Jacob, a blacksmith, aged 45, whilst at work, let fall a bar of iron on his left foot; the great toe was much bruised, and the extravasated blood turned the nail black. Having neglected it, a collection of pus formed beneath the nail, loosened it, and, after finding vent, it left the toe in an ulcerated state, which was kept up by the nail being forced into the flesh.

The patient, tired out by pain and by the persistence of the disease, applied to a quack, who first tried to cut the nail, but failing, he endeavoured to tear it off. He was equally unfortunate in this, for the nail broke instead of coming away; the wound was laid bare, and the patient dressed it himself with a blackish ointment, which the man gave him, but of the name and nature of which he was ignorant. As he continued to suffer, and saw that his toe got worse instead of better, he came to the Hôtel-Dieu on the 24th December, 1812. At this time the toe was swollen, and was very painful when put to the ground. The new nail had forced itself into the flesh. Before operating, poultices were applied for some days. I then divided the nail into two parts lengthwise, and, laying hold of them successively with the dissecting forceps, I tore them away, turning back the one outwards, and the other inwards. When the scab fell off, it was discovered that some portions remained, which I removed with a bistoury, as well as the skin which formed their matrix. By doing this I prevented all chance of any relapse, having deprived the nail of its reproducing organ. Since then the wound was dressed with lint, sometimes dry, sometimes dipped in a stimulating lotion, according to its state, and the patient left the hospital in less than a month with only a small point of ulceration, which healed in two or three days afterwards.

Case IV.—*Osseous tumour existing for several months on the upper part of the last phalanx of the right great toe, raising up the nail. Extirpation of the tumour and of the nail.*—Louisa Duvillard, aged 15, of good constitution, experienced acute pain in her great toe, in May, 1821, which was aggravated by walking; on examining it, she found there was a small excrescence beneath the nail. A medical man, who was consulted, prescribed several topical applications, but without effect. During this time the patient walked with difficulty, and in great pain.

She came to the Hôtel-Dieu on the 1st of July, 1822. A small, hard, resisting tumour, about the size of a large pea, and very painful on pressure, existed under the nail of the right great toe; the nail was lifted up, and the free extremity separated from the upper surface of the third phalanx. I detected the osseous nature of the tumour, and determined on removing it. The patient had a bath, and after a few days' rest I operated as follows, on the 6th of July. I circumscribed the base of the tumour by an incision with a strong straight bistoury, and removed it entirely without touching the nail. But little blood followed. A very thin cushion of lint was inserted between the nail and the flesh, and a poultice applied round the great toe. On the 10th, the lint was taken out; suppuration had commenced. The dressing was renewed daily, and on the sixteenth day after the operation the patient was able to walk without the slightest pain. On the 1st of August, the nail was still separated from the soft parts, and had not resumed its natural position; however, the cicatrization of the little wound was complete, and there was neither protuberance nor hardness. The patient walked well, and felt no pain, and she left the hospital on the 4th August.

In April, 1823, she came again to the hospital, with the nail of the right great toe growing into the flesh. She said that about three months after she quitted the hospital the cicatrix became soft; a little blood was discharged after a longer walk than usual, and from that moment the whole of the skin surrounding the nail had become the seat of inflammation, which was kept up by the lateral edges of the nail being forced into the flesh. I had no doubt as to the propriety of removing the nail, and soon circumscribed the affected part by an incision; the operation was speedily over, notwithstanding the screams and resistance of the patient. Suppuration was established in a few days; some cellular and vascular excrescences were destroyed by nitrate of silver, and the patient finally quitted the hospital on the seventeenth day after the operation, quite cured.

Such is my mode of proceeding in simple cases of in-growing nail; but I must observe that it is by no means of such frequent occurrence as may be generally believed; and although it would appear, by surgical books, that cases are met with daily to which the above operation is applicable, every hospital surgeon must know how rare it is to see the affection so limited or so little advanced, as to be cured by the simple removal of the nail.

I wish now to direct attention to another stage of the disease which requires quite a different treatment. In 1814, Mr. Wardrop[1] published an account of a sort of whitlow which he named *Onychia maligna,* and which is nothing more than ulceration of the matrix of the nail. But Wardrop, in pointing out this disease which I had alluded to several years previously, has confounded together several varieties of this affection; and, in consequence of this confusion, he has proposed the same treatment and the same rules for cases altogether unlike. I have not arrived at the same conclusions; I have distinguished this affection from that which originated from in-growing nail. They are quite different, and consequently the treatment should differ. If the first of these propositions should be established, the second will follow as a matter of course.

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[1] 'Med.-Chir. Trans.,' vol. v, p. 129.

In stating that the nail itself could not be considered as liable to any disease, I admitted that it might be more or less altered in its structure, form, or direction, and that it might, in consequence of such alteration, injure the adjoining skin. I have, therefore, classed together those affections which arise from alteration of the nail; and have made a separate class of those in which the mischief originates in the surrounding integument. It is with the latter that we have now to do.

They may arise, like the former, from an external or mechanical cause, or from a peculiar morbid action. Thus, the surrounding skin may be irritated by contusions, pressure, punctures, lacerations, and lesions of all sorts, and inflammation may follow sooner or later; and the same has been observed in men who work in alkali manufactories, and especially amongst soap-boilers. In cases where there is no external cause, it is a much more difficult subject. These cases may frequently be due to the action of syphilitic virus, and, occurring at the matrix of the nail, they have been then named *onglade*.[1] Almost all the authors who have written on venereal diseases, have omitted to speak of this affection. Hunter, Swédiaur, Astruc, Benjamin Bell, Cullerier, and Lagneau, have not alluded to it; neither is it mentioned in the 'Nouveau Dictionnaire de Médecine,' in Samuel Cooper's Dictionary, nor in the 'Dictionnaire abrégé des sciences médicales.' Wardrop has confounded it with the common inflammation of the matrix of the nail; and Boyer has not pointed out these ulcers when treating of venereal ulcers generally. Boyveau-Laffecteur has afforded them a line and a half; the 'Dictionnaire des sciences médicales', half a page; and Jourdan, in his 'Traité des maladies vénériennes,' has said a few words about them. Whatever may be the cause, whether a syphilitic virus exist or not, and whether the *onglade* be due to its presence, it is nevertheless certain that this disease shows itself in a very peculiar form: 1st, it affects the nails of the feet and hands indiscriminately; 2nd, it attacks several at once; 3rd, it sometimes shows itself in small ulcers at the intervals between the fingers, whence it spreads to the circumference of the nail; 4th, the nail is detached spontaneously from the integument; 5th, it resists all antisyphilitic remedies; (I have tried more than thirty times, and I have never found that mercury, though administered judiciously internally and externally, and sometimes for a long period, produced any satisfactory result; on the contrary, I have seen it make the wound blacker in colour and more fetid in smell: Mr. Wardrop says, however, that he has given mercury with success;) 6th, the cure is effected by simple dressing, as soon as the nail has fallen off. In regard to the greyish colour of the bottom of the ulcer, and the form which is said to be peculiar to venereal sores, a person must look with a partial eye to detect these characteristics in the ulcers round the nail; and, setting aside all the peculiarities which I have enumerated, the most experienced surgeon would find difficulty in distinguishing it from common inflammation of the matrix of the nail. M. Lelut, in his excellent work on *Onglade,* is also of opinion that the affection is not of a syphilitic nature. Moreover, it is not a common disease, since there have been only four patients with it during the past year in the venereal hospital of Paris.

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[1] [The French term has been retained, in the absence of any corresponding English word.—T.]

CASE V.—*Onglade.*—Caroline N—, a woman of the town, aged 22, was affected, on the 17th of March, 1826, with an indolent discharge which had continued for a month; mucous pustules were also developed on the labia and parts near the genitals; there were also some reddish superficial sores at the lower extremity of the right nympha. Mercurial fumigation was ordered.

30th June. There were red spots at the margin of the anus, and superficial mucous pustules. The genitals were healthy, excepting slight ulceration about the commissures. Same treatment continued. On the 15th of August, these symptoms had disappeared.

On the 21st of September, the patient had several sores at the matrix of the nails of the two fore-fingers, and another near the nail of the right great toe. The ulceration commenced near the root of the nails, and formed a sort of ridge round them; soon afterwards the root detached itself, and the body alone of the nail adhered to the skin; suppuration became abundant, and the patient suffered acute pain, especially in the foot, which prevented her from walking.

On the 16th of October, the nails of the great toe and right fore-finger were removed; the first came off easily, but the other adhered firmly to the skin by its body only. The pain was now limited to the finger on which the nail still remained. It may be a question whether the nails would grow again regularly. The wounds looked rather badly, having a fungoid aspect, and suppurating copiously. They were bathed at first with diluted chlorate of soda, and afterwards dressed with opium cerate.

Case VI.—*Onglade.*—V—, aged 38 to 40, of good constitution, and usually living in the country, had several ulcerations, which she was told were syphilitic, at the root of the nails of the two great toes, of the third left toe, and of the index and ring-fingers of the left hand. When I first saw her, the nail of the right great toe was off, and the ulcerous sore, simply dressed with cerate for some time, was going on well. The nail of the ring-finger was also detached, and the wound was almost healed by means of simple dressing. The nail of the third left toe was nearly detached, and this gave but little pain; but the principal point was the nail of the left great toe. The disease had existed only a short time at the base of the nail, and was accompanied by all the symptoms of the most acute inflammation. The patient said that she had never had any other symptom of syphilis, and several medical men who saw her told me the same. The inflammation had originated without any known cause; the different fingers and toes had been attacked successively at short intervals; and when the nails came off, which they did spontaneously, the wounds soon got better and healed. Leeches were applied round the left great toe, which bled freely, and the pain was diminished. Antisyphilitic treatment was tried, but as the mischief was sensibly aggravated, it was discontinued. I am now trying antiphlogistic means, and I shall remove the nail as soon as it is practicable; and there is every reason to believe that it will heal as quickly as the others.

The two cases I have just cited are in many respects incomplete; but I have thought it right to bring them forward, as some of the facts which they comprise may tend to clear up the disputed question in regard to the affection now under discussion.

In the first case it is difficult to affirm that there was syphilis. At first there was a discharge which did appear to be of a venereal character; mercury was employed, and the discharge continued, though less abundantly; a slight improvement, due, perhaps, to rest, regimen and refreshing drinks, rather than to the medical treatment. Six weeks later there were new symptoms, which were probably venereal, but I do not think they were a continuation of the first. After a second treatment there were no other symptoms, and a month afterwards the first sign of disease of the nail made its appearance. The question is an obscure one, but the very obscurity of the causes induced me to cite the case.

In the second case there was no reason to suspect syphilitic infection. The nail disease appeared as an isolated fact, unconnected with any local or general derangement of the system. The administration of mercury produced no good result; and, which is more remarkable, the fingers and toes healed spontaneously as soon as the nails came off. The two cases mentioned by Lelut in his work also prove the inefficacy of mercury in this affection.

It would seem as if the disease, which I have designated as *onglade*, had no other object than the release of the nail; when once off, all goes on well, and a simple cerate dressing is sufficient to ensure recovery. It is very different from those incurable ulcerations of the skin forming the matrix of the nail.

I have occasionally seen alteration of the matrix of the nail in persons affected with impetiginous eruptions. A case of this sort occurred recently at the Hôtel-Dieu, which I cured by the use of sulphurous lotions. In regard to the other cases of inflammation not due to any mechanical injury, we do not know generally whence they originate; and instead of seeking to explain them, the simpler course is to admit that they are due to some constitutional peculiarity.

I thought I could easily distinguish the affection which commences with in-growing nail, from that which originates in the skin, by the following peculiarity: when the disease is produced by the nail, the fungous growths to which the inflammation has given rise are in front and on the sides of the nail; but when it is an affection of the skin, they are always at the base of the nail. In general this is a characteristic distinction; but after all, what are these fungous growths but a consequence of inflammation of the skin? And since it is clear that the inflammation, from either cause, may extend to all the surrounding skin, any distinction that can be made must depend, chiefly, on the condition presented in a more or less advanced state of the disease. The cases, however, in which the two varieties combine are rare, and it may be affirmed that the line I have drawn is really founded on general observation and experience.

However this may be, the disease gives rise to very similar results. The skin is stretched, of a violet-red colour, and painful; the nail is shortened and reduced in width; sometimes, indeed, it has wholly disappeared, and, instead of a nail, there are only some traces of a horny substance; the nail, too, is frequently found concealed beneath the fungous flesh; its colour is grey or black, and in certain cases it does not adhere as in its normal state: the wound generally discharges a sanious or bloody pus, with a very fetid smell. When the patient walks or even stands, the fungous growths begin bleeding; no sort of shoe can be borne, and the least friction is excessively painful; it is almost impossible to remain in the same room with patients affected by this disease, to such a degree is the air and clothing about them tainted by the combination of the ichorous pus oozing from the ulcer, and the copious perspiration from their feet.

These symptoms occur in nearly every case; sometimes, however, the affected spot is immediately beneath the nail, when small swellings occur which raise up the nail, and occasion greater pain in consequence of the pressure. These tumours may be of various kinds, either fibrous, cartilaginous, osseous, or vascular; and as a proof that their development is due to the alteration of the skin which covers the nail, I may add that, if the operation be limited to the removal of the tumours, without cutting back the skin from which they originated, the latter usually becomes diseased, and must be extirpated sooner or later.

It may be imagined, from what I have said, that the treatment I have adopted so successfully in cases of in-growing nail, is not applicable to the other variety, in which the skin is diseased, and towards which the remedies should be directed. If nothing more be done than removing the nail, the seat of the evil will still remain, and it has been proved by numerous observations that this affection is not to be so cured. If caustic be applied after the removal of the nail, the skin only is destroyed which is immediately subjacent, leaving that which invests the root extending very often to a great depth.

These considerations have induced me to remove, not only the ulcerated parts but, the whole of the fold of skin whence the nail originates and derives its nourishment.

In performing this operation, I make the patient sit on a bed or a chair, and, holding the diseased toe with the left hand, I make a deep, semicircular incision with a straight bistoury, three lines beyond the fold of skin which supports the nail at its root. This incision is in a direction parallel to the fold, which it entirely circumscribes; then, the toe being held by an assistant, I draw forward the flap with dissecting forceps, and detach with the knife all the skin that is connected with the nail, and contributed to its production: if any traces of horny substance remain, I extirpate these also, so that no part of the diseased tissues is left. All the white and fibrous parts at the bottom, or the sides of the wound, should be carefully removed; for these are the rudiments of reproduction of the nail, which would keep up the disease.

This operation is always attended with very severe pain, but it does not last long. The toe should be immediately covered with a piece of lint spread with cerate, and a thin pad of lint completes the dressing. The leg should rest on a pillow, and be half bent on the thigh.

The patient usually feels some pain for several hours after the operation; but this soon passes off, and in three or four days the first dressing may be removed; the wound is then almost always covered with healthy pus. Simple dressing is continued; the surface of the wound is soon covered with vascular granulations, which must be kept back from time to time with nitrate of silver. Should any small horny fibres be reproduced, they should be torn away, and the portion of skin which gave them birth should be cut away; and the part will generally heal by the fifteenth or eighteenth day, when the patient may resume his usual avocations.

If the cicatrix be examined some time after the operation, it will be found to consist of a smooth thick skin, without any nail, but having sometimes a horny consistence. In cases attributed to syphilitic taint, I have followed up the operation with the knife by cauterizing the parts with a strip of lint dipped in nitrate of mercury, which most effectually prevents any relapse, as the diseased organs are destroyed.

In proposing this as the quickest and the surest mode of treatment, I do not mean to say that an operation is always indispensable. I would recommend the trial of other means, avoiding so painful an operation, such as antiphlogistics of all sorts, baths, rest, leeches, poultices; or else the treatment adapted to syphilis, such as calomel powder, mercurial ointment, &c. In private practice I have sometimes successfully used an application of lint steeped in strong red wine and liquid acetate of lead, in the proportions of one pint of the former and one ounce of the latter.

Case VII.—*Removal of the matrix of the nail.*—On the 3d of May, 1814, a man was admitted to the Hôtel Dieu, named J. Charit, who had just left the Hospital of La Pitié. For six months he had observed a peculiarity in the two great toes, different from the others; he was compelled to go to the hospital in consequence of the pain he had suffered so long, of the impossibility of walking for a quarter of an hour without resting, the continual discharge of a blackish fetid pus with which the nails of both great toes were continually bathed. For some days the feet were cleansed, and simple dressings were applied; at length he was operated upon; and, according to his account, they cut through the middle part of each nail with scissors from the front to the root; then both portions were taken off with dissecting forceps: the operation was very painful; inflammation was kept down, and the patient was promised a speedy recovery. The fungous ulcerations, however, continued, the suppuration was still blackish and fetid, and with it some softened fragments of horny matter came away; the pain became gradually more intense, and at last he quitted the hospital.

On his admission into the Hôtel Dieu, the portion of skin, which in a healthy state underlies the nail, presented an ulcerated, fungous, blackish, fetid surface; at intervals there were some uneven pencils of fringed horny fibres, adhering to the skin at one end and free at the other. At the junction of the lateral edges with the upper surface there was some of the nail in the flesh, a portion showing itself of a prismatic shape. The fold of the skin, which serves as the base for the root of the nail, and which constitutes its matrix, was in a disorganized state.

When I saw him in the morning I pronounced it to be an organic affection of the matrices of the nails, and proposed my mode of treatment to him.

He was carried to the theatre and laid on a bed. I took hold of one of the toes, and with a straight bistoury I made a deep, semicircular incision, parallel to the fold of skin which supports the base of the nail; with the same instrument I cut deeply into and wholly removed the fungous and horny growths of which I have spoken, as well as the triangular piece; and I also carefully removed those portions of the flesh from which appeared to originate some irregular, uneven, greyish excrescences, the product of a vicious secretion of the corneous substance which constitutes the nail. The operation was performed on both toes, and was borne with firmness by the patient. The toes were simply dressed in the way described above.

The patient suffered great pain for a few hours after the operation, but was afterwards very quiet. In five days, the first dressing was removed, when suppuration had begun; a similar dressing was applied. Some cellular and vascular excrescences were kept down with nitrate of silver. As the left toe gave some pain, I examined it carefully, and, perceiving some thin horny fibres in the angle where the upper surface joins the lateral edges, I removed the part, after having circumscribed with the bistoury that point of the skin from which it originated. The pain soon ceased altogether, and he could walk about the wards of the hospital without inconvenience. On the eighteenth day after the operation cicatrization was complete, and he was in a condition to quit the hospital.

Case VIII.—*In-growing nail of the left foot. Avulsion. Affection of the matrix of the nail of the right foot. Removal of the skin.*—Letourneur, aged 18, of strong constitution, was admitted to the Hôtel-Dieu towards the end of July, 1826.

At the external edge of the left great toe, the nail was growing into the flesh. There was nothing peculiar in this affection: the skin all round the nail was red and swollen, but not ulcerated, except at the point of insertion; the extremity of the toe was slightly swollen, and the pain was rather sharp, but bearable. The patient complained more of the pain which the right toe gave him; this was not the same affection: the skin round the nail was ulcerated throughout; fungous growths rose at the base, and the nail itself was blackened and separated into several strips of irregular shape; in fact, all the symptoms of in-growing nail were clearly developed.

I was much struck with the singular conjunction of the two varieties of the disease in the same person; and I remember another similar case which occurred to me in the course of my practice. A different treatment was necessary for each toe. The nail of the left one was divided with scissors into two equal parts, and these were torn away, care being taken to eradicate every part that remained. Then, with a bistoury, I took off all the skin which gave origin to the nail of the right toe. There was but little blood lost. The patient, who had suffered much, was then carried to bed, and the wounds were properly dressed. The wound left by the removal of the nail of the left toe was completely cicatrized in six days, but the other was not cured in less than eleven days. On the fourteenth day after the operation, the patient quitted the hospital quite well. On the 18th of October he came again to the hospital, to ask for a certificate; and the toes were examined, and appeared in a very satisfactory state. The cicatrix was well formed and smooth, and the skin in some parts had something approaching to a horny consistence; but the nail had not reappeared on either toe, and the patient walked without the least inconvenience.

Case IX.—*Crushed nail. Ulceration. Repeated operations. Recovery.*—Hippolyte, a sawyer, received a blow on the great toe, in November, 1825, by a piece of wood falling on it. The nail presented an ecchymosed condition, and was, as it were, flattened; the flesh round it became inflamed, and ulceration took place at the inner side. The toe was leeched and poulticed, and the patient kept his bed for twenty-eight days, when he went to work again still suffering. The soft parts became much swollen, and discharged a little blood during the day, when he was tired with walking, and at night the bleeding was more copious. For two months he tried all sorts of ointments. After this, he went into a hospital, where the nail was taken off by passing a bistoury between it and the skin, but without touching the root. The surrounding soft parts were not excised, but they were brought together by a small bandage, which caused considerable pressure on the toe. The wound was cicatrized in ten days, except at a single point. There was no trace of a nail, and the small ulcer was cauterized daily with nitrate of silver. Forty-two days after he entered the hospital, the patient quitted it, but without being completely cured; he was advised not to walk, but of this he took no heed. Eight days after, the mischief reappeared in a worse form than before. At the two posterior angles of the cicatrix, there were two fragments of a horny substance which seemed disposed to unite, and which irritated the cicatrix very considerably. Fungous growths then began to appear round the root of the nail, and the ulcer on the inner side was large enough to admit the end of the finger. The patient came to the Hôtel-Dieu on the 26th of February. I removed the nail and the surrounding flesh, as I have already described. The wound cicatrized; but there still remained a small ulcer at the inner edge, as after the first operation. A month afterwards, a small fragment of nail appeared at the bottom of the ulcer, which I removed, forming a flap above it. The wound was dressed with cerate; it bled for a few days, because the patient chose to get up, but afterwards it went on well, and no further portion of nail made its appearance. The part soon healed, and the patient was radically cured of a disease which had continued for six months, and had not yielded to any of the means previously tried.

Case X.—*Nail growing into the flesh. Relapses. Various modes of treatment.*—Another patient was admitted into the Hôtel-Dieu, in 1825, whose case is very interesting, in consequence of the frequent relapses, notwithstanding the various modes of treatment that were resorted to.

Lalande, a baker, had his great toe crushed by a rough stone, in July, by which the flesh, towards the anterior and inner angle of the nail, was much bruised and lacerated. The nail was divided in halves, and a good deal of blood was discharged from the wound; for the first fortnight the toe was swollen, and so painful that the patient had no sleep. These symptoms became worse when he deviated a little from strict regimen. He went to a hospital a fortnight afterwards. The surgeon availed himself of the accidental lesion of the nail to remove the two parts, simply by turning them back on themselves; and the toe was bound round. Four days after, it was observed that a reproduction of the nail, at the edges, had commenced; and a new nail was soon developed, which, growing over the wound, prevented the formation of the cicatrix. A month had scarcely elapsed when it was found necessary again to have recourse to avulsion; and it was performed, as on the first occasion, without destroying the root. The nail came again; and after remaining two months and a half in the hospital, the patient quitted it, contrary to the advice of the surgeon.

Though he was not cured, he resumed his usual occupations, and continued them for four months and a half in constant pain; and, as the mischief was increasing, he came to the Hôtel-Dieu on the 18th of March. The nail was then separated into numerous fragments, and the surrounding soft parts were so swollen and fungiform, that they covered nearly the whole nail. I cut into them deeply; but the patient was so restless during the operation, that I could not remove the whole of the flesh at the edges. Hence, there sprang up two small portions of nail at the posterior angles of the wound; the latter quickly cicatrized throughout. The small fragments were moveable, and easily torn away; but, fearing a repetition of the reproductive process, I destroyed their matrices by two longitudinal incisions. On the 13th of May, Lalande left the Hôtel-Dieu quite cured.

The reproduction of the in-growing nail has been very ably described in the work of M. Jardon. He observes, that tightness of the shoe increases the transverse curve of the nail to such an extent, that the extremities of the curve or lateral edges become almost perpendicular. When the nail assumes this vicious form it is in vain to remove it, as the matrix itself, by which the nail is moulded, is distorted, and the nail must necessarily take the same direction.

With reference to the cases just cited, it will be seen that they tend to confirm what I had previously advanced. Therefore, I will confine myself to a recapitulation of the principles I have established, in such a form as may be readily understood.

1. The term "nail" should be applied only to the hard horny substance, and not, as several anatomists have done, to the portion of skin which adheres to and produces it.

2. The nail being only an inorganic production, there cannot be any disease of the nails; but the disease is always in the skin which surrounds them.

3. The nail may, however, be primarily altered by some external force brought to bear upon it, whereby its substance, form, or direction is physically changed; but so long as the distortion of the nail produces no irritation of the skin, there is no disease.

4. Inflammation of the skin of the nails may result from an organic or an inorganic cause.

5. The disease differs in its characters according to the part it attacks, or according as its origin may be primarily an alteration of the nail or otherwise: the treatment varies in these cases.

6. In general, when the nail is affected, the distortion which results causes it to press on the flesh, and this constitutes in-growing nail.

7. The affection of the nail which causes it to grow into the flesh, may be primary and dependent on some external cause, or consecutive to some modification of the skin which produces it.

8. Avulsion of the nail is the only certain mode of treatment for in-growing nail; and this is unsuccessful when the affection of the nail is consequent on disease of the skin.

9. The disease, characterised by primary inflammation of the matrix of the nail, is altogether distinct in its symptoms, its results, and above all in the treatment it requires, from that which is due to the antecedent alteration of the horny substance.

10. The affection of the skin around the nails, called syphilitic, and named by authors *Onglade*, is but a variety of what I have described; it is essentially the same disease with some different characters, and it may receive the same treatment, seeing that anti-venereal remedies are inefficacious.

11. The removal with the bistoury of the whole of the diseased skin should be preferred to every other therapeutic measure; it is both quicker and more certain.

12. In all cases, however, other means ought not to be neglected; as by antiphlogistic, discutient, antiseptic, or cathartic remedies the patient may be spared a most painful operation.

SECTION VII.

TRAUMATIC EMPHYSEMA.—EMPHYSEMA ARISING FROM FRACTURE OF THE RIBS, AND FROM LACERATION OF THE LUNGS AND THE PLEURA.

As a consequence of fractures of the ribs, especially where the fractured extremities are pushed inwards and lacerate the lungs and the pleura, it sometimes happens that air is diffused into the neighbouring parts, and infiltrated into the cellular tissue, distending the cells, and giving rise to the affection named Traumatic Emphysema. As respiration is continually going on, the quantity of air taken in at each inspiration increases this result, so that emphysema may extend over the whole body. Its formation is the more rapid, since, in this sort of emphysema, there is usually no wound in the parietes of the chest. In regard to the exciting causes, fractures of the ribs offer essential differences to be considered, because the accidents resulting from them are very various, and are sometimes fatal.

At times some external violence acts upon the sternum, which is pressed towards the vertebral column, and the curvature of the ribs is pushed beyond the natural elasticity of these bones; at other times the chest is compressed transversely, and the tendency of the ribs is to straighten, the pressure acting in each instance on the very point of fracture. In the first case, namely, that in which fracture arises from an indirect cause, the fragments are forced outwards, and the resulting accidents are, in general, unimportant; but this is not the case in other fractures. We have not only to anticipate injury to the intercostal artery, but also the lesion of much more important organs. The principal accidents arising from fractured ribs are—1st, laceration of the pleura; 2d, injury of the intercostal artery; and 3d, of the lungs, and consequently emphysema.

But there are other primary complications which are much more serious, which are not alluded to by authors, and which occasion immediate death. The large vessels, the pericardium, the heart itself, may be extensively injured, of which Cases 3 and 4 offer remarkable examples.

By chance two individuals lately came to the Hôtel-Dieu, suffering in a very different degree from traumatic emphysema. Fortunately, we have here two analogous cases, which, from the nature, the diversity, or the violence of the producing causes, necessarily put on varied forms and characters.

Case I.—*Fracture of the ribs by a wheel passing over the chest. Emphysema.*—A water-carrier, aged 68, was struck on the 8th December, 1832, by the pole of a wood-dealer's cart, and thrown down in a position nearly transverse to the wheel, which passed over the anterior and left side of his chest. Though the cart was empty, the weight of the wheel was sufficient to produce the following effects. The man had cough, great oppression, and frequent, hard pulse. On an attentive examination of the right side of the thorax I did not detect any lesion: but on the left side there was great pain towards the precordial region, which was very sensitive to the touch. On applying the hand, a manifest sensation of crepitation was perceptible, similar to that occasioned by the rubbing together of the broken ends of fractured ribs during the respiratory movements of the thorax. This condition was also perceptible to the ear, which likewise detected a sound analogous to that which would arise from the fall of drops of water in rapid succession. There was also a considerable swelling on the same side, without the least appearance of inflammation or discoloration of the skin. The swelling yielded to the hand, by which it could be shifted from place to place; and this was not all, for on pressing it in this way, a decided crepitation was felt, such as occurs when the cellular tissue of animals is inflated for the purpose of skinning them. These were unmistakeable signs of fracture of the ribs and of emphysema in this region; that is to say, an infiltration of air into the subcutaneous cellular tissue. The life of the patient, nevertheless, did not appear to be in danger; the emphysema was inconsiderable; hitherto it was confined to the left side of the chest, and there was nothing to show that it had invaded the internal organs; and experience has proved that, when this phenomenon is circumscribed in extent, and the infiltration of air does not exceed a few cubic inches, the absorption is accomplished easily in a short time. It is, on the other hand, very serious when the air has filled not only the whole extent of the cutaneous cellular tissue, but also that of the internal organs of the thorax, and even of the abdomen; when there is not only infiltration, but even extravasation of air into the great cavities of the serous membranes. This was the case with another patient, of whom I shall shortly speak. In regard to the one now before us, it is necessary to take account of the lesions which directly gave rise to the development of emphysema. I have already stated what signs indicated fracture of the ribs; and it happened no doubt that the fragments, pressing upon the pulmonary organs, lacerated the pleura, and, perhaps, penetrated the air-vesicles to a greater or less extent; whence arose an organic lesion of the lungs, and the irruption of air towards the thoracic parietes. In this case the small quantity of air which escaped from its natural channels, would lead to the belief that the laceration was not extensive.

I will now explain the mechanical nature of this infiltration. When, in consequence of old attacks of pleurisy or pleuro-pneumonia, organic adhesions are formed between the two pleuræ, establishing a continuity of tissue between the parietal and costal layers and the surface of the chest, it is easy to understand how emphysema occurs;—the air passing directly from the interior of the lungs into the newly organized cellular tissue, and thence into the subcutaneous cellular tissue. When there are no adhesions, the inspired air escapes partly by the aperture made at the surface of the lung, and spreads at first into the surrounding tissues, and into the pleural cavity. Thence it is forced every way, both by the alternating movements of expansion and contraction in breathing, and by its natural elasticity; and infiltrates gradually into the cellular tissue and into all the internal and external organs; so that, if the quantity of extravasated air is considerable, it occupies not only the walls of the thorax and of the abdomen, the upper and lower extremities, the scrotum, the neck and the head, but also the pleuræ, the two mediastina, the pericardium itself, and even the cellular tissue which unites the various organic elements which compose the lungs.

The patient in question was at first bled on the day he entered the hospital; this was repeated on the following morning. Compresses, saturated in a solution of acetate of lead in water, were applied to the affected side, and the trunk was enveloped in a bandage. In making use of the latter, I sought to suspend the respiratory action of the external muscles, and to compel the patient to breathe only by the diaphragm; with the view of favouring the union of the fractured ribs, as well as of opposing, as much as possible, the causes of emphysema. I can prove by examples the possibility of breathing solely by the aid of this internal muscle. Indeed, such must be the case when all the external muscles are paralysed, in consequence of a lesion of the upper part of the spinal cord.

Case II.—*Fracture of the ribs by a kick. Emphysema. Death. Autopsy.*—A man, older than the last, and of much stronger constitution, was felled to the ground in a quarrel; and his adversary, not content with this, kicked him repeatedly on the chest, principally with his heel. Several ribs were fractured, the fragments of which were forcibly pressed inwards, seriously wounding the lungs: extensive emphysema followed, which soon spread to the shoulder, then to all the anterior and posterior regions of the thorax, to the neck, in which the swelling was considerable even the day after the accident, and finally to the abdominal region and scrotum. The man was otherwise suffering from long-standing asthma, dependent on disease of the heart,—a most unfavorable complication in the case.

So extensive an emphysema is always, in itself, a very serious affection: the infiltration progresses frightfully; the atmospheric air, as I have already shown, rapidly invades the cellular tissue of the internal organs, and the patients are soon deprived of the power of respiration. I have seen many die in great agony from suffocation produced by the above causes. It may, therefore, be imagined what is likely to happen when the respiratory functions are impaired by severe asthma, in addition to emphysema such as occurred in this instance. Patients in such cases soon die; and I quite despaired of this old man's life. You will have observed his deep anxiety, his impotent efforts to articulate even a few words in answer to questions: at every inspiration a fresh column of air escaped through the opening of the lung and aggravated the mischief; not only was there superficial infiltration, but also extravasation of air into the great cavities; the expectoration was tinged with blood, showing severe injury of the lung; the pulse was small, contracted, and irregular. Under such circumstances, every effort of art was futile. What could be done? Could we adopt the same means as were used in the last case? they would only have hastened his death; for it may be conceived that a body-bandage would have increased the agony to the last degree. Incisions of the skin have been recommended, so as to admit of the escape of the infiltrated air; and, although I have not the slightest confidence in this measure, I have tried it on different parts of the body, principally on the surface of the chest, rather in conformity with received opinion than in the hope of any good result. They did no good, and it would be needless to say why. In the treatment of limited emphysema, circumscribed in extent, in which there is well-grounded hope of successfully combating the causes which gave rise to and supported it, and in which, consequently, the organic lesions are not beyond the resources of art, it may be imagined that incisions made on the spot might prevent a more extended infiltration of air, by providing it with a superficial exit; but in cases analogous to that I am now relating, the insufficiency of this resource is too clear to require further demonstration.

The anticipations in the present case were but too correct: the patient died a few hours afterwards, and the autopsy confirmed the previous diagnosis. Externally there was general tumefaction, without discoloration of the skin, soft, unequal, easily impressible, and capable of being displaced readily by the hand, and accompanied by that peculiar crepitation which marks emphysema. Internally, the great quantity of air in the anterior and posterior mediastina was extraordinary; and its presence was likewise detected throughout the whole extent of the interlobular tissue of the lungs. Three ribs were broken on the right side, and the corresponding surface of the lung presented an extensive and deep laceration.

In the first case a speedy improvement was manifested. In six days the patient felt no uneasiness on the side affected; the effort of coughing gave no pain; the expectoration bore no trace of blood; the infiltration had almost entirely disappeared; the pulse was good, the respiration was very little obstructed, and the appetite returned; the patient rallied speedily, and was soon afterwards discharged quite cured.

It has been seen in these two cases that emphysema bore an important part; it was the most prominent feature, and was carried to such an extent, especially in the latter, that it became of itself a serious disease, independently of the grave lesions which gave rise to it. In other cases, it appears only as a secondary symptom, not easily to be recognized. It is necessary, however, to ascertain its existence, not only with a view of arresting its progress, but also to avail ourselves of it in the diagnosis of other complications.

Case III.—*Fracture of ribs. Wound of the heart by a fragment of rib. Instant death.*—Aubin, a carman, aged 23, of strong constitution, being at the time rather intoxicated, was caught between the nave of the wheel of his own cart, and that of another coming in an opposite direction. He immediately lost all consciousness, and when brought to the Hôtel-Dieu, he showed no signs of life.

Autopsy.—There were slight ecchymoses on each side of the chest, showing that this cavity had been transversely compressed. On removing the integuments covering the ribs, it was found that the eighth and ninth were fractured at the union of the posterior two thirds with the anterior third. There was a depression at the seat of the fracture. There was nothing remarkable in the right pleura, the left was filled with a large quantity of black blood, liquid and mixed with enormous clots. The diaphragm was pushed downwards; the lungs were driven upwards and inwards. On getting rid of the extravasated blood, the source of it was sought for. The arch of the aorta, and the thoracic portion of this vessel, were not touched.

The pericardium presented a slight bluish tint, and contained a little black coagulated blood. On its left side was an aperture two inches long, directed from above downwards, and from left to right. The heart was large and firm; on its posterior surface there was a transverse wound, one inch and a half long, penetrating the cavity of the two ventricles, the edges of which were slightly ecchymosed, as if a transverse incision had been made after death with a blunt instrument, for the purpose of examining the cavities of this organ. This wound corresponded exactly with the aperture in the pericardium. The costal pleura was lacerated at the level of the eighth and ninth ribs, and the fragments of the eighth were driven inwards. The anterior fragment was sharp and pointed, and projected considerably into the cavity of the pleura; this evidently caused the wound in the pericardium. The fragments of the ninth rib were scarcely displaced. The left lung showed a slight ecchymosis at its base. The air, when introduced into the parenchyma, did not escape at any one point, nor reveal any wound. The pulmonary tissue crepitated throughout. There was no laceration of the diaphragm, and consequently no communication between the thoracic and abdominal cavities. There was, however, some extravasated blood in the left hypochondrium, proceeding from the spleen, which was lacerated transversely at the upper part of its internal face. This laceration could only be occasioned by a violent contusion. The liver was pale; the stomach contained some half-digested food; the mucous membrance was discoloured. All the organs were partially exsanguineous.

Where the sternum is forced in or fractured, accidents similar to those which arise from fractured ribs may be observed. The instance which I shall now recite, proves that the pericardium and the heart itself may be injured; I have, therefore, thought it right to publish and place side by side, these two cases. J. L. Petit says, that he opened the body of a man who had died from a fracture of the sternum, and that he found the heart compressed and contused by the pressure of the second bone of the sternum; the pericardium was filled with bloody serum, as well as the cavities of the two pleuræ.

Case IV.—*Fracture of the ribs. Laceration of the pericardium. Superficial wound in the right ventricle of the heart by a fragment of the fractured sternum. Emphysema. Death on the twelfth day. Autopsy.*—Mahuet, aged 41, of robust constitution, had been squeezed laterally against a wall by the pole of a carriage, and he was brought to the Hôtel-Dieu on the evening of the 9th of July, 1827. His breathing was extremely short and laboured; on the left side there was no visible injury; but the sternum was fractured transversely at the junction of its superior two thirds with the inferior; and the upper fragment was rather deeply depressed towards the mediastinum. On the right side, on a level with the fourth, fifth and sixth ribs, and at four or five fingers' breadth from the sternum, there was a considerable depression, at the bottom of which crepitation could be felt, indicating a fracture of these bones, and probably of their cartilages also. The finger could likewise plainly distinguish the projecting extremities of the external fragments. A little below the seat of these fractures, there was an ecchymosis as large as a five-franc piece.

The features of the patient expressed deep anxiety; his speech was short and interrupted; pulse frequent, small, and almost imperceptible; skin cold.

The fingers, when carried in front of the seat of fracture, detected a crepitation similar to that produced by air traversing the cells of the cellular tissue; but that which was most worthy of remark was, that, at every inspiration, this tumour increased considerably, and extended from the inferior part of the sternum to the seat of the fracture; whilst it diminished, on the other hand, at every expiration; on a level with the depression resulting from the fracture of the ribs, the skin rose and fell alternately in the same manner, but forming a much more extensive tumour. The slightest pressure detected emphysematous crepitation, and sufficed to disperse these tumours. In the inferior two thirds of the right cavity of the chest, the stethoscope detected a distinct gurgling sound. The patient was bled, and the chest was enveloped in a moderately tight bandage.

The patient was at first relieved by this support, as it diminished the pain from which he was suffering; but on the fourth day the oppression all at once increased, the cheeks became flushed, the pulse very quick and hard, but still small. He was bled again. The patient continued, for ten days, alternating; the tumours had disappeared; there was not a trace of emphysema in any part; but a broad and very black ecchymosis extended from the base of the chest to the superior external part of the thigh; the breathing became more and more distressed, and death ensued on the twelfth day.

At the autopsy, some old and very strong adhesions were discovered between the two pleuræ; the superior fragment of the sternum was entangled in the pericardium; the right ventricle of the heart was torn by this fragment through two thirds of its thickness. There was a large quantity of bloody serum, and in some parts black blood, almost without any mixture, in the right pleura; the fourth, fifth, and sixth ribs were fractured, and further, their cartilages were detached from the sternum. Between them there was a lacerated aperture large enough to admit a finger easily.

TRAUMATIC EMPHYSEMA OF THE EYELIDS.

The introduction of air into the sub-cutaneous or inter-muscular cellular tissue not only complicates perforated wounds of the chest, but it may take place in every region near to the breathing apparatus. Emphysema of the eyelids is not an uncommon disease; many authors allude to it, but I have seen only one case at the Hôtel-Dieu in Paris.

CASE V.—*Emphysema of the eyelids, in consequence of a supposed fracture of the flat plate of the ethmoid bone, or of the os unguis.*—A terrace-maker, aged 25, was struck by a fall of earth on the right anterior part of the head, neck, and chest; on recovering himself, he felt only a slight pain at the root of the nose, to which he paid little attention, and continued his work. About a quarter of an hour afterwards, on trying to blow his nose, a considerable swelling of the eyelids appeared all at once on the left side, and it was carried to such an extent that the eye was completely closed. Let us inquire into the cause and nature of this swelling. Was it erysipelas? The skin, indeed, was bright and stretched as in this affection, but there was not the bright redness, nor the burning heat which characterise it; and the eyelids preserved their natural colour and temperature. Was it œdema? This does not form so rapidly, and there was not that doughy feel of the tissues which is observable in serous infiltration. Was it extravasation of blood? Such an extravasation would have been recognized by the existence of violet-coloured ecchymosis, and by the general brown colour, more or less deep, of the eyelids. These negative signs led me to the belief that the swelling was produced by the infiltration of air; and on carefully touching the affected parts, I ascertained most positively that there existed emphysematous crepitation, not only at one point, but throughout their whole extent. Not wishing to decide entirely on my own judgment, I begged others to examine the patient, and they all confirmed my opinion. It would be useless to demonstrate that this crepitation is the characteristic sign of the presence of atmospheric air in the cellular tissue of the swollen part. Whenever, in similar cases, the skin has been divided by a bistoury, a certain quantity of air has escaped at the apertures. In the bodies of persons who had died from serious emphysema, or from the effect of the attendant organic lesions, the presence of air has been recognized wherever crepitation had been ascertained during life. Having had under my care a case in which there was positive proof of the existence of this phenomenon, I was determined, by peculiar circumstances, to use the bistoury at the swollen parts, and a pretty large quantity of air instantly followed the incisions: there was not, therefore, the smallest doubt in that case; but in the present one, it was to be ascertained how the infiltration could have been brought about. I imagine that the fall of earth occasioned great compression of the face, causing the fracture of the flat plate of the ethmoid or the os unguis, through which aperture the air passed from the nasal cavities to the interior of the eyelids. It is strange that the emphysema was not developed immediately after the accident, but after a certain lapse of time, on the patient attempting to blow his nose: but this peculiarity may be explained; for the fracture of the ethmoid or os unguis was undoubtedly not accompanied by laceration of the soft parts which cover them, and these opposed the passage of the air; but afterwards the patient, in blowing his nose, having driven a column of air against these parts, they were lacerated, and a communication was formed between the nasal cavities and the eyelids. I was desirous of knowing if he had, after the accident, passed any blood from the nose, which had happened in all similar cases that I had seen; but it appeared from the answers of the patient, that this did not occur.

The treatment consisted of a general bleeding, and the application of compresses dipped in a discutient wash to the base of the orbit. The patient was particularly recommended not to blow his nose, to avoid coughing, or any other effort that might renew the passage of air through the supposed aperture; by which means I expected he would be well in a few days. On the third day, the crepitation had very much diminished; on the fourth, it was almost imperceptible; and on the fifth day the eyelids were nearly in their natural state.

The following case is very analogous to the preceding, from which it is only distinguished by a slight difference in the seat of the lesion which caused the emphysema.

Case VI.—*Emphysema of the eyelids, caused by a supposed rupture of the pituitary membrane.*—Another young man received a violent blow on the nose, by the fall of a plank, and it was followed by great pain; but some hours afterwards, having blown his nose violently, he felt as if a train of fire shot up from the sides of the nose to the inner angle of the eye, which spread to both the left eyelids. They became immediately so puffed that the eye was completely closed and light was intercepted. The patient was received into the Hôtel-Dieu. The eyelids were very rigid and resisting, but the skin was not discoloured. Emphysematous crepitation was detected. The same means as in the last case effected a cure in four or five days. I considered that the blow had caused laceration of the pituitary membrane, opposite the upper border of the alar cartilage of the nose, which was detached from the inferior edge of the nasal bones.

EMPHYSEMA OF THE TEMPORAL REGION, ARISING FROM FRACTURE OF THE FRONTAL SINUS.

Emphysema may occur at the most elevated parts of the respiratory channels, from causes far more serious than the preceding. The following is an example.

A man fell on the anterior part of his forehead. Some time afterwards a rather large tumour was formed in the temporal region. Its character appeared obscure; but on compressing it lightly, I found that it moved to the anterior part of the forehead and disappeared entirely. It proceeded from air passing into the surrounding tissue from the frontal sinus, which was fractured and laid open beneath the skin.

It would be easy to multiply examples of traumatic emphysema resulting from punctured wounds of the chest; or from a communication of another kind, occasioned by external violence, with other portions of the air passages. But the cases already reported, and the considerations for which they served as a text, appear sufficient to give an exact idea of this singular affection, so as to make known the basis of the diagnosis, as well as the appropriate treatment. It only remains to add a few words relative to the infiltration of air into the highest points of the respiratory apparatus.

Besides the so-called emphysematous crepitation and the negative signs already indicated, it may be observed that whenever the patient is desired to blow his nose, to ascertain the nature of the complaint, the swelling of the eyelids or other parts affected increases considerably. If the case be one in which the patient is in a state of complete unconsciousness, on pinching his nose, an instantaneous increase of the swelling is apparent; which is occasioned by the column of expired air being obstructed at its natural outlet of the nostrils, and finding vent by the new channel accidentally formed. In every case of emphysema of the eyelids, the development is extremely rapid, arising no doubt from the great laxity of the cellular tissue contained in them.

The prognosis of traumatic emphysema is in general serious; in two of the preceding cases it terminated fatally. It is of course more dangerous when the circulating centre and the pulmonary system are injured; in which case the patient is a prey to extrēme agitation; the suffocation and convulsive movements are at times very violent, and asphyxia soon follows.

The treatment should be energetic. In the first case it was seen that the emphysema yielded quickly to bleeding, discutients, and a body bandage; and you must have recourse to these remedies in most cases. When there is great difficulty in breathing, the chest must be relieved from the extravasated air, and a passage must be made for that which is infiltrated into the cellular tissue. An incision is then made on the spot over the fracture; and when the balance is well established, the air has no longer any tendency to insinuate itself beneath the skin. When the infiltration is very extensive, it is sometimes necessary to scarify the body in various parts. This advice is good when the air introduced into the cellular tissue spreads quickly over the whole body, and life is threatened; but it is not equally sound when the emphysema is limited. Ambroise Paré, Hunter, and Sabatier cite cases where deep incisions saved the patients; but these extravasations of air more frequently disperse of themselves by absorption. Dry or aromatic fomentations, compression, repose, proper diet, and mild drinks, are auxiliary measures which ought not to be neglected.

Before closing this subject, I may remark that there is another species of traumatic emphysema occasioned by the bite of some insects, and especially of some reptiles. And I may add that traumatic emphysema is sometimes voluntary. Dr. Jacquemin and I have seen several examples amongst prisoners, who, to feign having a painful swelling of the face, pricked the inside of the mouth with a needle, and by firmly closing the nostrils and lips, forced the air from the lungs through the little wound into the cellular tissue. The cheek becomes, in such cases, enormously distended by emphysema, and the eyelids swell, presenting a shining appearance; so that an inattentive medical observer, or one not well acquainted with such tricks, might be imposed on. Other persons, to excite pity, perform the voluntary operation by forcing the air through a small tube introduced into a puncture.

SECTION VIII.

ON NERVOUS DELIRIUM.

An operation is skilfully performed; the assistants applaud the dexterity of the surgeon, and yet the most serious accidents may threaten the life of the patient: sometimes violent inflammation appears in the limb subjected to operation, or in some internal organ, and carries off the patient at the very moment when success seemed certain; sometimes there is purulent absorption, which is ushered in by chills and febrile disturbance, the cause of which is almost always beyond the resources of art; again, the troubled state of the irritated nervous system is indicated by painful spasms, which frequently degenerate into fatal tetanus; or lastly the brain, being excited by pain, by fear, or even by joy, the conceptions of the mind cease to have any connexion with surrounding objects, and the patient loses his reason at the very moment when he most requires it. To these last-named accidents I wish now to direct attention. Obscure in its origin, variable in its progress, and frightful in its symptoms, nervous delirium is nevertheless rarely fatal, when met in time by proper remedies.

No author, that I am aware of, has taken any notice of this form of delirium. Celsus, Paré, Dionis, and numbers of others since them, who have written on surgery, have not noticed it. Books have furnished me only the following example.

A woman, aged 28, cut her throat, in consequence of being suspected of participating in a robbery committed in her master's house. The wound, somewhat superficial, had opened the larynx at the cricoid cartilage. The patient was robust, which promoted cicatrization; but her imagination was so excited, that she was seized with violent delirium, which continued for ten days, without fever or inflammatory symptoms; it yielded to soothing remedies. The wound could not be dressed during this time, and forty days elapsed before it cicatrized.

Many surgeons, it is true, give accounts of patients who delighted in tearing open their wounds, and thus destroyed themselves; but none have considered the cause, or have ever dreamt of applying other means than force to cure this species of insanity. In treating persons otherwise healthy, these means might suffice; left to itself, the only effect it would have would be more or less to exhaust the patient, according to its duration and intensity; but in almost every case, this affection is complicated with wounds which require the greatest care and absolute quiet. How can the most simple fracture be cured under constant movement? What dressing can be applied to a wound which is unceasingly irritated by continual agitation? How can we expect an union of parts, which can take place only by constantly keeping them at rest, as where callus has to be deposited near to joints? What grievous results might arise from pain and inflammation, especially if the injured part were near to an important viscus? The danger is still greater after a serious operation, such as cutting for stone, amputation, or removal of a cancer; and I have more than once seen nervous delirium supervene in these cases. Trifling shocks may produce hemorrhage; and, even if stopped, it might immediately recur, and endanger the success of the operation.

Before entering on the considerations which these questions suggest, I will cite several examples of this unfortunate complication occurring with wounds or operations, so that a more accurate idea may be formed respecting it.

Case I.—*Extensive sarcocele. Operation, followed by nervous delirium.*—C——, a trader, aged 25, of lymphatic temperament and low nervous power, was operated upon in June, 1817, for a large sarcocele. Impressed with fear of hemorrhage, he was in a constant state of disquietude during the day following the operation, and this aggravated an indocility which was natural to him. On the following day, the agitation increased; he was distressed by a movement, a gesture, or a word; the slightest impression redoubled his fears. His general condition was, notwithstanding, satisfactory; but he soon began to complain of pains in the limbs and the chest; his eyes became animated, he breathed hurriedly; he asked for food, and would get up. His mind wandered, he repelled his attendants, and called out for his family, whom he had left far away. His whole body was in motion. His cries, his brilliant eyes, the immovable pupil, his face covered with sweat, and his pulse quiet and regular in the midst of this disturbance, assured me that this was nervous delirium. The patient complained of very severe pains in the chest; but a most careful examination did not detect any lesion. I prescribed what I have usually administered so successfully in such cases; namely, an injection containing six drops of laudanum, which was given at once. Some friends who were about him were sent away, and he was left quite alone. An hour afterwards he ceased talking, and fell into a sleep from which he did not awake till the next day; and then the delirium had ceased. In twenty-five days he was completely cured.

Case II.—*Nervous delirium following fracture of a rib.*—Langlois, a mason, aged 26, came to the Hôtel-Dieu, in the month of May, with a fractured rib, which was occasioned by a fall from a first story. His chest was tightly enveloped in a body-bandage, to prevent any motion of the thorax, which was requisite for the cure. The facility with which such fractures unite, was the reason why little attention was paid to him; but, on the third day, he was seized with delirium without intermission. He was agitated in a thousand ways; all his muscles were in a state of constant tension, the eyes bright, the skin covered with sweat; but the pulse alone was quiet. He fancied he saw figures dancing in the air, that experiments were being performed on his bed, and that all the patients in the ward were undergoing the same ordeal. This idea disturbed him excessively; he was fearful of the effects, and hesitated whether he should remain or get away. This man, who was of sanguine temperament, was at once bled, which had no quieting effect; an injection, containing ten drops of laudanum, was then administered, which produced a slight amendment. On the following day the dose was doubled, without any greater improvement. His cries disturbed those around him; and as he was, on the other hand, disturbed by the continual movement in the ward, he was removed to a place where he was alone. The dose of laudanum was increased to forty drops, and then this treatment took effect, and the delirium ceased.

You may readily conceive the serious consequences of such continued disturbance to a patient whose case specially required rest and quiet. The pleura, irritated by the rough edges of the fractured rib, became inflamed, and the lungs were affected; a cough, and expectoration tinged with blood, showed that we had to deal with severe peripneumonia, which was the more serious, inasmuch as the exciting cause was incessantly aggravated by fits of coughing. He was bled, and had soothing drinks. He appeared to be cured; but convalescence was far from complete; his countenance became pale, and his strength did not return. He coughed often, felt oppressed and feverish, and when he left the hospital, after remaining there two months, he had every appearance of being the subject of chronic pneumonia.

Case III.—*Attempted suicide. Nervous delirium.*—Vincent, aged 32, Chasseur in the 3d Regt. of Guards, of bilious nervous habit, being embroiled in a dispute, determined to destroy himself. He got drunk on the 18th of April, 1817, entered the Church of Nôtre-Dame, and there cut his throat. He was immediately brought to the Hôtel-Dieu. The skin was divided from one angle of the jaw to the other; anteriorly some of the muscles were cut, and the instrument had penetrated into the pharynx between the os hyoides and the thyroid cartilage. The wound was dressed, and he was watched. On the second day he was seized with delirium, which had no special character, but which was likely very much to retard recovery. He was confined in a strait-waistcoat, and he had a soothing draught with half an ounce of syrup of poppies, which had but little effect. At length he came to himself; but the efforts he had made for 24 hours were attended with mischievous consequences. He felt a smarting and a sensation of strangulation, and was besides tormented by a violent cough, accompanied by purulent expectoration. On the fourth day, the wound had an unfavorable appearance; and on the seventh day delirium returned, which was successfully combated by the same means. These and some other accidents were very critical, but the man recovered after 50 days' treatment.

CASE IV.—*Attempted suicide. Nervous delirium.*—Le Y—, aged [illegible], a wine-merchant, Rue St. Antoine, having in a short time dissipated a considerable sum of money which he had amassed with great labour, became extremely despondent. The [illegible] of his [illegible] [illegible] the feeling of impatience, and in a moment of despair he wounded himself in seven places with a pair of scissors. Three of the wounds appeared to be deeper than the rest. Brought to the Hôtel-Dieu, he was immediately bled, and had administered a soothing draught, containing laudanum, which did not calm the delirium. On the second day he was again bled without any good effect; he fancied that he was pursued by police-officers, and tried to escape; it was found necessary to tie him down. In spite of this agitation, the pulse was not quick, the tongue was clean, the body covered by abundant moisture, and the appetite was good; but he would not eat, as he was constantly pursued by the idea of the police. For two days he remained in the same state, though he was again bled twice, and took antispasmodics. On the fifth day he was ordered two injections, each containing ten drops of laudanum; and these had scarcely been administered when the delirium abated; and with the aid of injections it entirely ceased in six days. A fortnight afterwards he was again brought to the Hôtel-Dieu for a fresh attempt at suicide, and the wounds he had inflicted with the scissors were so numerous that they looked like the punctures made in scarifying. The nervous delirium having again shown itself, he was treated and cured by administering laudanum in injections.

CASE V.—*Cataract. Operation by keratonyxis. Nervous delirium.*—Madame R—, at the age of 58 years, found her sight getting weaker, and at 61 she could no longer distinguish between light and darkness. When received into the Hôtel-Dieu, the crystalline lenses were completely opaque. All the conditions being favorable, the operation by keratonyxis was performed, after 14 days of preparatory treatment, as usual. In the course of the day she had frequent vomiting, which subsided by the next day, under the influence of antispasmodic draughts. On the third day there was cephalalgia and scalding tears; foot-baths and two injections were ordered. On the succeeding days intense inflammation of the eyes and eyelids supervened. A portion of the cataract rose at the back of the right pupil, and formed an opaque half-moon. The left pupil took a square form, and behind it were seen portions of the crystalline lens and of its membrane of a bright red colour; other portions of the same bodies were in the anterior chamber; the patient could not see, and suffered extreme pain; a seton was introduced into the nape of the neck.

During the night of the fifteenth day, intense nervous delirium came on, and it was found necessary to put on a strait-waistcoat. On the following day the patient recognized her attendants, but complained of some imaginary ill-treatment she had received, and answered questions incoherently: antispasmodics were ordered, and mustard plasters to the legs; no improvement. On the seventeenth day, an injection with eight drops of laudanum; drowsiness towards evening. On the eighteenth, fresh delirium: injection with ten drops of laudanum. On the nineteenth day the delirium ceased, and did not return.

Here terminates what relates to our present subject; but I may add that, after various accidents to the organs of sight, the patient left the hospital in a most satisfactory state.

Case VI.—*Fracture of the inferior extremity of the fibula, and of the internal malleolus. Nervous delirium.*—M—, aged 54, when very drunk, was descending a step seven or eight inches high, in doing which he placed his foot in such a manner that one-half was on the step and the other half over its edge; he fell on his left side, and was unable to rise. He was conveyed to the Hôtel-Dieu, where the surgeon on duty recognized all the symptoms of a fracture of the inferior extremity of the fibula, with rupture of the internal malleolus at its base. The common splint for fractures of the leg was at first applied: there was great pain, and swelling round the joint. On the following day, I applied my own apparatus and evaporating lotions.

On the third day, the pain subsided, and the swelling diminished. On the fourth, violent delirium supervened, which made it necessary to use a strait-waistcoat: an injection with 8 to 10 drops of laudanum was administered. On the following day the delirium had ceased, and the remedies were discontinued. On the sixth day it returned, and continued till the eighth, but yielded at length entirely to repeated injections. This complication in no way retarded the cure of the fracture, notwithstanding the involuntary movements of the patient. In thirty-six days the consolidation of the fracture was perfect, and the limb was not in the least deformed.

CASE VII.—*Comminuted fracture of the leg. Nervous delirium. Death. Autopsy.*—On the 5th of December, 1831, a man was brought to the Hôtel-Dieu, who had been engaged in a quarrel, and had his leg fractured. The limb exhibited great deformity; the superior fragment had lacerated the soft parts, and made a triangular aperture through the skin. The fracture was reduced, but during the whole night the patient screamed frightfully. On the following day, he appeared to be in a sort of intoxication, and during the dressing he never ceased crying out. I considered this want of courage or excessive sensibility of the patient a very bad symptom, from which serious consequences often arise. He was bled three times successively. On the succeeding day he appeared a little better, but on the third day he had delirium, and his ideas were incoherent and confused. It was the day on which the relatives of patients are admitted to visit them; and it frequently happens on such occasions that they have some improper food, or receive some disagreeable news; at least it often happens that their condition is worse during the succeeding evening and night. The change that took place in the general state of the patient in question may have arisen from one of these causes. It was ascertained that he was deeply engaged in some affair of interest, and had been in great trouble; indeed, he was continually repeating, during his delirium, that his remaining in the hospital would ruin him. He was ordered to have leeches, a soothing draught, and an injection of assafœtida. All these measures were unavailing, and on the morning of the 9th, the patient died.

The death of this man raised several important questions. Had he fallen a victim to one of those internal inflammations which are often indicated only by fever or delirium? Or had he died from the consequences of the fracture, or from a lesion involving the nervous system? Further, it was required by the ministers of justice to solve this question, namely, whether the fracture was occasioned by the patient falling during the quarrel in which he was engaged, or directly caused by kicks on the leg.

At the autopsy, which took place the next day, I observed that it was very difficult to conceive how such a fracture could be produced by the man falling simply from an erect position; that, under the actual circumstances, this was not probable, and, if not absolutely impossible, at least it required concurrent facts to prove it, which we were unacquainted with. On the other hand, such a fracture might result from a variety of causes, such as a fall from a first story, a wheel passing over the limb, &c. It may be imagined, then, that there was great difficulty in deciding by what means this had been caused. An examination of the fractured limb showed that the parts had been violently crushed; the tibia was broken into several pieces, the fibula was fractured, and the soft parts were contused and lacerated: the left pleura contained a quantity of blood: the brain was healthy.

These particular facts naturally lead me to the consideration of this complication of fractures and operations with nervous delirium, which cannot be considered altogether as traumatic delirium.

Up to a certain point the diagnosis of this form of delirium may be established according to the nature or duration of the operation, the character, moral energy, and physical condition of the patient; but there are certain indications which precede it with greater certainty.

If the patient, during the evening or the day or two succeeding any fracture, dislocation, attempted suicide, or operation, should show symptoms of unnatural cheerfulness; if he talks much; if his eyes are bright, his speech short, his movements sudden and involuntary; if he affects a courage and resolution now no longer necessary, be upon your guard; keep the patient perfectly quiet; keep him from light, from noise, and from all intrusive visitors. You may, perhaps, succeed in keeping down the nervous excitement; but in spite of all these precautions the disorder may break out. Amongst persons under most favorable circumstances, it shows itself more frequently in a sudden and unexpected manner by gestures, by extravagant and unmeaning movements, and by incoherent remarks, in which a singular confusion of ideas prevails as to places, persons, and things. A prey to sleeplessness, they are usually possessed of some fixed idea, almost always having reference to their profession, their passions, their tastes, age or sex. They are continually throwing themselves about; the upper parts of the body are covered with sweat; the eyes become bright and injected, the face animated and suffused; and they give vent, with extraordinary loquacity, to menaces and fearful clamour. Their insensibility is often so great, that individuals with comminuted fractures of the lower extremities have been known to tear off their splints, and attempt to walk on their crushed limbs without manifesting the slightest suffering. Others, with fractured ribs, have moved and sung without apparent pain; whilst some, who had been operated upon for hernia, have introduced their fingers into the wound, and coolly handed their intestines as if they belonged to a dead body. This was the case with a rich old man on whom I operated for strangulated hernia in 1812. He was in bed, and so quiet that every one was congratulating himself on the success of the operation; when, on examination, it proved that he had removed the dressings, and seemed to be taking a savage pleasure in tearing his own intestines, which he had drawn out of the wound made at the operation. He died, a victim to this horrid mania, from the consequences of very acute peritonitis.

Notwithstanding the gravity of these symptoms, the pulse is tranquil and calm, showing no alteration, except such as is produced by the movements of the body; there is no fever: the excremental functions proceed with regularity; but there is no appetite; and in five or six days the disorder generally terminates either by death, or more frequently by a complete cure. If the latter happily take place, tranquillity is re-established, without any apparent crisis, as suddenly as the disorder commenced. Worn out by fatigue, the patients fall into a sound and quiet sleep, and, in ten or fifteen hours at the most, they wake up with their reasoning powers quite restored, not remembering anything that has passed, but weak and sensible to pain: the appetite returns, the primary disease takes its course, and everything goes on in an ordinary manner. The delirium may return two or three times, after one or more days' remission, but always more feebly at each relapse.

The most decisive sign is the calm circulation and the absence of all febrile symptoms, in the midst of this mental disturbance. You see a patient furious, and quite out of his mind, the sweat running down his face, with sparkling eyes, and screaming loudly; and you would fancy he was in a violent rage. Examine his pulse; it is quiet and regular, and the state of the skin leaves no suspicion of inflammatory action. It is true mania, and differing only in its duration, which seldom exceeds five or six days.

Nervous, faint-hearted persons, and those whose brain is affected by some strong and deep-seated resolution, are the most liable to this delirium. Thus, it is frequent in cases of attempted suicide, so much so, indeed, that some persons have thought it peculiar to them. Athletic individuals are not exempt from it, and it may take place without reference to age, sex or habit. It is consecutive to dislocations and fractures, reduced or unreduced, well or ill managed; to hernias, to wounds, to operations of every kind, and generally to nearly every kind of surgical disease; and at any period, during inflammation, suppuration, cicatrization, &c.; in a word, to diseases and consequences of operations so perfectly different, that it is impossible to assign any single cause for it. It cannot, for example, be attributed exclusively to traumatic affections, for we have seen it without them; nor to inflammation, for it exists where there is none; nor to the accidents attending this process, for it comes on when this is going on in the most regular manner; neither can it be attributed to the formation, abundance, absence, or suppression of suppuration; for, in most cases, these processes go on with the same regularity before, during, and after its subsidence. Women are less subject to it than men, and it has never been known to occur in children.

Nervous delirium may become very dangerous in itself. I remember a young man who suffered from it, in consequence of a simple excoriation of the great toe, and who died in eight and forty hours, the original malady not having, apparently, contributed in any way to his death. In the great majority of cases, however, I consider the extent of the delirium to bear a proportion to the gravity of the diseases which give rise to it. Thus a fatal termination is much more to be apprehended when delirium follows a fracture of the limbs or the chest, or after severe wounds in the neck, than in simple wounds which are not in themselves of a dangerous character. Examination of the bodies after death does not give evidence, either in the cerebro-spinal centre, or in any other organ, of any lesion explanatory of the disorders that had occurred, or of the cause of death.

After much reflection on the cause of this delirium, I am unable to give any good account of it; but the following is the result of my observations: In every individual there exists an amount of moral force, analogous in many respects to the physical power, equally susceptible of being increased, diminished, excited, or even destroyed by the imagination alone, and exhausting itself by pain, as the latter is exhausted by loss of blood. The fear of an operation, which is always worse in imagination than in reality, the sight of the necessary instruments and apparatus, a peculiar nervous susceptibility, and that state of excitement which leads to suicide, are so many causes which act the more surely in proportion as the pain has been small and the apprehension more acute.

A person undergoing an operation without losing a drop of blood, would be much more liable to inflammatory action than one who has lost a moderate quantity. It is necessary, if I may so express myself, that the power should not be greater than the resistance, in order that the equilibrium be maintained. To apply these considerations morally: when the excitement has not been restored to its natural tone by prolonged endurance, when the imagination has, as it were, been cheated, and no longer finds its counterpoise in physical energy; this excess of activity flies to the brain, whence it emanated, reacts upon it, and induces nervous delirium.

It would be absurd, on this principle, to pretend that pain ought not to be regarded, and that no notice should be taken of a patient's cries; but it may be understood, on these grounds, why the most brilliant operations, those which occupy the shortest time, are not always the most successful.

It may not be without interest to say a few words here respecting delirium tremens, which so much resembles nervous delirium. Indeed, a very little observation will show, that patients suffering from either generally have the same current of ideas. A carman, a mason, or a carpenter, attacked by nervous delirium, is evidently impressed with ideas relating to his business. Some time ago, says Dr. Ramon, I saw a carman who was crushed by his own cart, whilst drunk; even when under the restraint of a strait-waistcoat, the patient was continually urging on his horses by words and oaths; at one moment he fancied he was going into a public house, and called for something to drink; then he called to his comrades, chatted with them, and asked them for help; in fact, he was always a carman. This same persistance of ideas frequently occurs with those who are affected with delirium tremens from drunkenness; which will be placed beyond doubt by a rapid sketch of the symptoms of this form of mental aberration. The first period is characterised by unusual agitation, anxiety, and sleeplessness; by want of appetite, nausea, and even vomiting, to which great drinkers are generally subject. The patient has hallucinations of sight, hearing, and touch; he is, however, able to convince himself that the objects he refers to are imaginary; he considers himself seriously ill. Little by little he believes in the reality of the fantastic images which are passing before his eyes.

This delirium frequently assumes a character of gaiety. The patient laughs heartily at his own jokes; he talks, gesticulates, and busies himself unceasingly with some imaginary work. At times these conceptions relate to his ordinary occupations, and at times they refer to obstacles which are always coming in his way. The extraordinary exertion he uses appears to account for the sweat which exudes from his whole body. The tongue is usually tolerably clean; the patients have scarcely any fever, and seldom suffer from thirst. In fortunate cases, after from one to seven or eight days, the patient feels a disposition to sleep, which at length he indulges. Restless at first, he falls at last into a sound sleep, and wakes in perfect health. The trembling is not considered, by most authors, as a constant and pathognomonic symptom; I have not alluded to it, nevertheless it exists in a great many cases.

Post-mortem examinations have not shown any appreciable lesions. In general there may exist a mere trace of vascular injection, which also occurs in many other diseases. Very often, however, the brain and membranes are in their normal condition.

We may conclude, then, from this account, that there is a great similitude between these two species of delirium, both in regard to their symptoms and their anatomical lesions. Particular cases, also, establish a similar analogy. Delirium tremens, like nervous delirium, is successfully treated by laudanum. It has been pretended that the disuse of spirituous liquors, bleeding, and water, would cure delirium, without the necessity of using opium; which may be true under certain circumstances; but I have seen so many cases treated successfully by opium, as to lead me to place reliance on its powerful influence.

Soothing medicine of every kind, and under every form, bleeding, even to syncope, and every other means that I have seen employed, or employed myself during a long practice, have always appeared to me to be inefficacious in this disease, neither stopping its progress nor diminishing its gravity. Narcotics, or the liquid laudanum of Sydenham, produce no favorable effect when taken into the stomach. This want of action is easily explained physiologically. The stomach, whose duty it is to elaborate the first elements of nutrition, is endowed with digestive power, and contains juices which, more or less, change the nature of the substances with which they come in contact; many medicines taken into the stomach are ineffective, because they are mixed with the food: this is the reason why many, especially of the vegetable kind, are so uncertain, very often producing no effect whatever.

The uselessness of many of these agents, and a knowledge of the modifying power exercised by the stomach on medicines, led me to use other means, which have invariably succeeded, and to which I attribute a sort of specific power. They are simple and energetic, consisting of a few drops of laudanum administered in an injection. Five or six drops, in a small enema, produce a greater effect than three times the quantity introduced into the stomach. The reason of this I have explained; but it may be added that the rectum, appointed to receive the residuum of digestion, absorbs, and does not digest; and it may be conceived that remedies so administered, when not expelled, must reach their destination more directly. These injections should be repeated two, three, or four times, at intervals of six hours; and, when retained, they will subdue the most furious delirium. One precaution is essentially necessary, namely, to empty the bowels previously, by means of a common enema.

SECTION IX.

ON ABSCESS OF THE RIGHT ILIAC FOSSA.

I observed, some time ago, that tumours were developed in the right iliac fossa, which appeared to be intimately connected with the walls of the cæcum. These tumours are often attended by remarkable disturbance in the functions of the large intestine. In a great many cases they terminate by dispersion, and in others by abundant suppuration; sometimes they are the foci of inflammation extending to the whole surface of the peritoneum. In all these different points of view, they ought to be carefully studied.

One of the first questions which naturally suggests itself is this: Why are they almost always formed in the right iliac fossa? Why is the left fossa so seldom attacked? No reason can be given except the form of the intestine and the surrounding parts. Immersed in a mass of cellular tissue, the cæcum, at its junction with the small intestines, presents such a marked contraction, that, in this spot (the ileo-cæcal valve) we frequently find collections of foreign bodies, which may sometimes be themselves the cause of these abscesses. In the same way splinters, fish-bones, pins, &c., are collected at the pylorus, and in the lower extremity of the rectum.

The relations and arrangements are not the same on the left side; the sigmoid portion of the colon does not present any contraction at either extremity, and the division of the intestine here is quite conventional. In explaining the different courses which these abscesses take, when existing on the right or the left side, it is necessary to remember the anatomical arrangement of the parts; and it will be seen that, on the right, the cæcum, free from peritoneal covering behind, offers less resistance to the pressure of the pus, and that its thin, wasted, ulcerated parietes must readily give way. On the other hand, on the left side, being hermetically enclosed in th peritoneum, and guarded by this membrane, as well as b aponeurotic expansion over the iliacus muscle, the pus cannot reach the intestine without raising up the meso-colon.

A readier exit is offered towards the crural arch and the inguinal ring; and, in this case, there is some difficulty in distinguishing this form of suppuration from hernia and other abscesses. I may add that, in this part of the intestines, the alimentary matter assumes an excrementitious character, and is forced onward against the laws of gravity; in many diseases, also, this portion of the intestinal canal is frequently the seat of inflammatory attacks. Now all these natural or morbid influences are quite sufficient to account for the production of congestion outside the intestine, and for its frequency in the right iliac fossa.

The appearance of these tumours is often preceded by precursory symptoms,—such as constipation or diarrhœa, or colic, habitual or otherwise; at other times, without any of these premonitory symptoms, the patient has violent colic and pains in the bowels, which tend to a concentration in the right iliac fossa; they may also take the course of the large intestine, or spread over the whole of the abdomen. These attacks of colic are generally accompanied by constipation, and more rarely by vomiting. Such are the indications of the first appearance of the tumour. The duration of these premonitory symptoms is very various: some persons have them for six or eight weeks, or even more, whilst others experience them only for a few days before inflammation takes place. It will be understood, of course, that these symptoms are only of relative importance, as they frequently occur in persons without any tumour forming.

The distinguishing symptoms of the disease are, the persistence of the pain at some particular part of the iliac fossa, and a swelling at this point. On feeling this part, it is found to offer resistance and to be in a state of tension; and a tumour may very often be detected, of considerable hardness, more sensitive to the touch than any other part of the abdomen, and appearing to rest on the cæcum. The patient complains of constipation, colic, and difficulty in voiding gas from the bowel. At times there is a great deal of fever, but n [illegible] commonly, where there is no complication of diseases, no [illegible] ymptoms are observed. Fever and inappetency are due to gastric affections, as also may be constipation and diarrhœa; or these may proceed from the greater or less size of the tumour.

The predisposing causes are of different kinds; but adult age has an undoubted influence. Of sixteen patients whose cases have been recorded, eleven were under 30 years of age; therefore more than two thirds are at an age when gastric disorders are most frequent. The constitution does not appear to have any influence, but the sex does, as the records of the Hôtel-Dieu show that men are much more subject to this affection than women. It is difficult, no doubt, to account for this; but it is the case, not only in hospitals where the males predominate, but also in private practice, where generally the reverse is the case. It very rarely occurs either in children or old people. The season does not seem to exercise any very direct influence on the appearance of these tumours; but they more generally occur towards the end of summer or beginning of autumn, when abdominal disturbances are most frequent; and this would tend to support the opinion of those who believe in the pre-existence of some lesion of the mucous membrane.

The occasional causes are both numerous and important. And first, the profession has proved in many cases a direct cause, by producing a lesion in the digestive canal, and, consequently, in the cellular tissue of the right iliac fossa. House-painters, colour-grinders, and brass-turners, who are constantly exposed to the dust and emanations from irritating metals, have experienced colics and diarrhœa, which, after a time, have led to the formation of the tumour we are considering. Many students have also been affected in the same manner, after great disturbance in the digestive functions.

The place of habitation is not unimportant; as I have seen many persons whose sufferings were due to their residence in Paris, after having been there but a short time. It is easy to conceive all that may happen to a person on his first arrival from the country. The food of the poor workmen, especially in summer, is so bad, that a large proportion of those who come to the hospitals with serious intestinal disorders, owe them to the food they are compelled to eat. Now all the causes which produce irritation of the mucous membrane, have a tendency also to produce inflammation of the iliac fossa. Drink will also give rise to the same disorders, and the reports of cases prove that most of the patients have been in the habit of taking alcoholic liquors, rendered irritating by the admixture of acrid infusions; whilst many others have taken purgative medicines in immoderate doses.

The progress and termination of these tumours is not always the same; the most fortunate and most common issue is by dispersion. M. Ménière has given a report of sixteen cases of abscess of the right iliac fossa, eleven of which dispersed under the influence of proper medical treatment. This dispersion is generally a slow process, and a hardness remains for a long time afterwards, indicating the seat of the original disease.

In other cases, painful pulsations are frequently felt in the inside of the tumours, which grow, soften, and end by opening into the intestine. This result is known by a pressing desire to go to stool, which is followed by purulent alvine evacuations, coinciding with the decrease of the tumour. The recovery is usually very rapid. These abscesses do not end only in the evacuation of the purulent matter by the cæcum; they sometimes open into the bladder or the vagina; and, again, they may discharge by an external opening, as happened in the case of M. Malus, to whom I was callėd in by M. Nacquart.

Case I.—*Perforation of the cæcal appendix, with an external communication, by a fistulous wound, with the right iliac fossa.*—M. Malus, inspector at reviews, aged 45, of short stature and indifferent health, was subject to rather frequent and prolonged catarrhal affections. In 1812 he was seized with extremely acute pains in the iliac region, accompanied by a rather large tumour, sensible to the slightest pressure; he was suffering also from obstinate constipation, abdominal distension, and fever.

This disorder, which was referred to an affection of the cæcum, with consecutive fecal obstruction, was treated with diluents, by long-continued baths, topical emollients, and a very spare diet. The pain and the fever gave way, but the evacuations did not resume their course. The constipation was then gradually overcome by purgative injections, and more especially by the continued use of infusion of senna, the result of which was that an enormous quantity of fæces came away.

Sulphurous douche baths, horse exercise, ass's milk, and a strict regimen completed his recovery, or rather very materially improved his general health.

These favorable conditions continued till early in February, 1815, when he was attacked by a pulmonary affection, with expectoration, at first bloody, afterwards rust-coloured. He recovered from this, and had even resumed his usual occupations, when he had a return of the pain in the ileo-cæcal region to a violent extent; there was a tense tumour of considerable size and exquisite sensibility; constipation as before. The treatment was repeated; baths, acidulated drinks, with gum, and castor oil in small doses. The patient was unable to bear the weight of the smallest plaster.

There was but little change up to the 13th of March; notwithstanding the evacuation of fecal matter, the tumour did not decrease to any extent; and this, combined with the nature of the evacuations, led to the belief that the tumour was seated outside the intestine.

The inflammatory condition became more and more decided, the tumour was hard, lobulated and uneven; it projected into the iliac fossa, and was five or six inches in size in each direction. M. Jacquemin and myself detected deep-seated fluctuation on the 14th of March. I made an oblique puncture, from which flowed a rather large quantity of reddish pus, of little consistence and fetid odour; the relief was instantaneous.

The fistulous wound continued to discharge a rather large quantity of pus; the patient became gradually weaker, and expectoration continued abundant. Three fresh openings, a short distance from the first, were successively made, communicating with the great sac: the pus was thin.

He remained nearly in the same condition till the end of the winter of 1816. The chest then became worse, the expectoration more abundant and decidedly puriform, and there was infiltration of the lower extremities. I should not omit to state here, that it had been observed on several occasions, when the wounds ceased to suppurate, that diarrhœa came on, and that this disappeared again as soon as the fistulous openings resumed their discharge of pus, which, moreover, was inconsiderable.

At length, on the 15th April, the patient, having been exposed to a current of cold air, experienced pain over the whole abdomen, accompanied by fever, and expired on the 22nd, of acute peritonitis.

The autopsy, which took place on the following day, presented the undermentioned results.

The body was completely discoloured, and to the highest degree emaciated; the extremities were œdematous; the thorax was resonant at almost every part; the abdomen was but little distended.

A widely spread purulent collection occupied the whole summit of the right lung. The remainder of this viscus, as also the left, were healthy and crepitant.

The peritoneum contained about three pints of reddish serum, with flakes of soft and discoloured fibrin; a similar exudation united a greater part of the convolutions of the intestines, the surface of which was rather injected.

That part which had been the seat of the tumour was carefully examined: the skin thin, and denuded to the extent of nearly two inches in diameter, was perforated by four apertures, which communicated with each other, and opened together into an empty cavity or sac, situated between the muscular fibres of the abdominal parietes and the external surface of the peritoneum; a portion of the cæcum adhered to this sac, and the cæcal appendix opened into it. This circumscribed disorganization, however, gave but an imperfect idea of the form and size of the tumour; it was a sort of cloaca, in which the appendix was expanded and blended with the parietes of the sac, to which it was attached by a rather compact cellular tissue. The cellular tissue of the iliac fossa was healthy, as well as the colon and the cæcum; it may be said, indeed, that near the intestinal fistula, the whole mass seemed to be in a fair way of doing well.

Notwithstanding the evident communication between the interior of the intestinal canal and the wound, by means of the appendix, no pus was ever noticed in the stools; nor was any fecal matter ever detected, either by the smell or colour, in the discharge from the wounds.

The course which the disease took in this case has always proved unfortunate, for the base of the abscess and its lowest part, resting on the iliac fossa, whilst the aperture is in front and towards the highest point, the evacuation of the purulent matter can take place but slowly and incompletely; hence that spreading of the pus in various directions; further, the aperture admits air, which decomposes the purulent matter. I would recommend, in such cases, that the patient should lie on his belly, so that the opening of the abscess should be the lowest part.

Inflammation and the diseases of the cæcal appendix, of which I have seen a great many cases, have scarcely been noticed by authors; but Dr. Melier, one of my pupils, has written an excellent work on the subject.

A remarkable fact connected with these abscesses is that the purulent matter may discharge itself into the intestine, without the fecal matter finding its way into the cavity of the abscess. For this, three reasons may be adduced. First, these abscesses empty themselves gradually, and the abdominal pressure, which is constantly in action, prevents the existence of an empty space into which fecal matter might be introduced. The second has reference to the obliquity of the aperture; and the third to the detached relation of the intestine, which performs the office of a valve.

Finally, under certain circumstances, which happily are of rare occurrence, the inflammation extends rapidly from the iliac fossa to the peritoneum, sometimes also to the peritoneal sub-cellular tissue. It is probable indeed, in some cases, that the inflammation, having attacked the peritoneum primarily but locally, is merely propagated from the iliac fossa to the rest of this membrane. This is a cause for considerable uneasiness, as death may result from such an extension of the disease.

With these preliminary remarks, I now proceed to cite some cases in illustration of my views.

Case II.—*Tumour in the right iliac fossa. External aperture. Death. Autopsy.*—A young man, aged twenty-three, fair, not robust, of scrofulous appearance, and working hard, experienced various symptoms, in December, 1828, of enterocolitis, which were at first left to themselves, and afterwards treated by purgatives; but the patient would not submit to any regimen. A phlegmonous tumour then appeared in the right iliac fossa, which was treated by topical emollients. The patient came to the Hôtel-Dieu when the abscess was on the point of bursting; the skin was immediately opened at the back of the iliac crest, towards the insertion of the quadratus lumborum, at the spot where a sense of fluctuation was felt, corresponding with that of the anterior tumour. The bistoury was plunged in to a great depth, and an abundant flow of pus followed. Although the sloping position of the wound should have prevented the pus from stagnating in the cavity of the abscess, it did not empty itself completely, and the tumor situated inside the crural arch continued to enlarge. A counter-aperture was made, but the increased discharge did not bring any relief. The patient grew weaker; the right thigh became infiltrated, diarrhœa came on, with hectic fever, and he died, after suffering for five months.

On opening the body, a large purulent sac was found, situated in the cellular tissue surrounding the cæcum, with burrowing channels following the direction of the psoas and iliac muscles. In some parts the bone itself was denuded. The cæcum did not communicate with this mass, but at the back part it was evidently attenuated; its mucous membrane was thickened, of a slate colour, and softer than in its natural state. There was chronic pleurisy, and hepatization commencing in the inferior lobes of the lungs. All the other organs were free from disease.

Case III.—*Inflammation in the right iliac fossa. Large abscess opening into the intestine. Recovery.*—A young man, aged twenty-five, of good strong constitution, had experienced dull colic pains for three weeks, especially after eating, when he was exposed to rain for an entire day, and found himself much worse. At length he felt a rather violent pain in the right iliac fossa, and came to the Hôtel-Dieu on the 24th of October, 1825. He appeared to suffer from pain, tension, and swelling in the right iliac fossa, the rest of the abdomen being supple and insensible; he had dull colic pains, frequent, but of short duration, during which the patient appeared to suffer acutely;

the pulse was, however, nearly in its natural state, as well as the temperature of the skin; the urine was passed freely, but the bowels were confined; the tongue was moist, and the appetite small. He was bled, and thirty leeches were applied on the painful part; a low diet was prescribed.

On the following day, the attacks of colic were less frequent and less acute, but the pain on pressure, the tension and swelling in the right iliac fossa continued. Sixty leeches were applied to the same spot.

On the 26th, violent colic, returning in paroxysms and tending to the seat of the inflammation; constipation, difficulty in voiding gas from the bowel; extension of the swelling in the right iliac fossa; slight acceleration of the pulse, without febrile heat or alteration of countenance. The patient was again bled, and twenty more leeches were applied on the same spot; a purgative injection was administered.

On the 27th, the congestion increased, and had the appearance of a hemispherical tumour in the iliac fossa, extending from the iliac crest to the pubis and umbilicus; painful pulsation internally, and great pain on pressure, continued constipation. No serious general symptoms were observable. Ordered a hip bath; syrup of buckthorn and castor oil, of each one ounce.

28th.—The swelling of the iliac fossa seemed larger to the eye, and passed beyond the median line of the belly, forming a sort of hard circumscribed globe, like the uterus at the seventh month of pregnancy; the protuberance was the more apparent, as the rest of the abdomen was flat, as in its natural state; fluctuation was obscurely felt in the interior. The patient had frequent desire to go to stool, but without any result. Two drachms of sulphate of soda were ordered. Light diet, bath, and poultice.

29th and 30th.—Four copious stools, attended with great relief; no change in the swelling; no general symptoms manifested themselves.

On the succeeding days the swelling of the abdomen diminished sensibly, and withdrew little by little towards the right iliac fossa, where it had originated. The patient said at the same time that, during the last three days, he had observed something of a whitish colour in his motions. They were immediately inspected (6th of November), and one motion was found to consist entirely of white purulent matter, thick, and in large quantity. It was then apparent that the decrease of the tumour took place from the time these motions commenced. The tumour was now confined to the iliac fossa; it was harder, and more sensitive on pressure than at first, and was scarcely larger than the fist.

Until the 14th of November, the motions, which were abundant, contained a mixture of purulent and feculent matter; the swelling continued to diminish.

Finally, on the 20th of November, the patient quitted the hospital; he was quite well, and was able to bear a half ration of food without indigestion; the motions no longer contained purulent matter, but a deep-seated induration could still be felt in the iliac fossa.

A few days afterwards he came to the hospital again, with symptoms of dysentery brought on by bad food, and too much of it. Proper diet and anodynes completely restored him.

In reviewing the symptoms in this case, in the order in which they occurred, we find that dull, frequent and transient attacks of colic preceded and accompanied the inflammatory swelling in the right iliac fossa; that, at a later period, this swelling was converted rapidly into a large abscess, to which the inflammation was confined, without extending to the peritoneum, as occurred in the previous cases; and that the purulent motions coincided with, and betokened, the discharge from the abscess into the intestine.

From these data it appears clearly that the seat of the disease was without the cavity of the peritoneum; for acute inflammation of this membrane is commonly accompanied by general symptoms, of which there were none in this case. The congestion seems to have arisen, and the purulent collection to have been formed, in the cellular tissue which covers the right iliac fossa, and envelopes the cæcum posteriorly. The colic, constipation, and difficulty in voiding gas from the bowel, were probably dependant on the pressure of the tumour on the cæcum, on the interruption of the peristaltic motion, and perhaps on the irritation and spasm of this portion of the intestinal canal, surrounded as it was by inflammation.

The evacuation of the purulent matter into the intestine, proved that the cavity containing it was deeply seated, and in contact with the parietes of this hollow viscus. Had it been nearer to the skin, it would have discharged itself externally; but, being opposed in front by the abdominal parietes, it found an easier channel of discharge in the cæcum, which was deprived of its serous envelope at the spot where the purulent collection was formed; hence, again, the obstacles to the perforation of the intestine were diminished.

However that may be, this favorable termination is an example of the resources of nature, in cases where art is usually much more uncertain in its results.

Case IV.—*Phlegmonous tumour of the right iliac fossa. Fistulous openings. Discharge of feculent matter. Recovery.*—A young man, a tailor, aged 24, came to the Hôtel-Dieu, in 1829, having in the right iliac region several fistulous openings, from which escaped pus, and afterwards feculent matter. The primary disease, for which he had been under treatment at the hospital at Orleans, was a phlegmonous tumour, at first neglected by the patient, and afterwards treated by emollient local applications. He had discharged pus in his motions; and his health had been partially re-established. He came to Paris to complete his recovery; but he found that his illness increased, the swelling augmented, and abscesses opened above the crural arch. These were accompanied by considerable emaciation, cough, diarrhœa, and œdema of the lower extremities; so that after he came to the Hôtel-Dieu, he was several times at the point of death.

At length, after some months' treatment, this patient's general health improved; he became convalescent, and quitted the hospital, after having a great many douche and other baths.

Case V.—*Inflammatory swelling in the right iliac fossa, ending in an abscess opening into the cæcum.* A young man, aged 20, came to the Hôtel-Dieu, on the 6th of September, 1827, with the following symptoms, which he had felt for a fortnight,—frequent desire to go to stool, simulating the tenesmus of dysentery, but without the discharge of fecal matter or intestinal gas; transient colic accompanied by borborygma and pains in the bowels; pain with circumscribed swelling in the right iliac fossa, but without fever or general disorder. At first he had nausea, and afterwards scalding and difficulty in passing his urine. These symptoms had arisen without any special cause; the patient was not subject to constipation, and had not been guilty of any excess; he had merely had diarrhœa for two days before the disease appeared. He was bled before he came to the hospital, and thirty leeches had been applied to the iliac region.

On the day he entered the Hôtel-Dieu, the patient had a copious purulent motion. On the 17th and 18th, he had several bloody evacuations of the same kind; on the 29th there was still some pus mixed with portions of feculent matter; the iliac tumour had in great measure disappeared; the motions began to assume their natural character; the colic had ceased; and the fourteenth day after the bursting of the abscess, the patient was convalescent.

The conclusions to be drawn from the seat, the symptoms, and the termination, of the disease in these cases are, that they are true inflammatory swellings in the neighbourhood of the cæcum, occurring external to the cavity of the peritoneum, but capable of involving this membrane in the inflammation.

The diagnosis of these tumours, and phlegmonous abscesses, seems to be sufficiently important to deserve some consideration.

It is not uncommon to see in the right or left iliac fossa, inflammatory swellings, which, to all appearances, have the same seat as those we have been considering; but which really have their origin in the cellular tissue uniting the fibres of the psoas and iliac muscles, and below the aponeurosis which has been named the fascia iliaca. This is a variety of the disease called by authors psoitis.

Case VI.—*Abscess in the substance of the psoas and iliac muscles. Retraction of the thigh on the pelvis. Death in consequence of ulceration of the colon. Autopsy.*—A woman, aged 45, exhausted by long-continued diarrhœa, was brought to the Hôtel-Dieu, on the 15th October, 1825. She was found to be in a most deplorable state, and reduced to the last degree of emaciation. On examining her, I discovered a tumour in the left iliac fossa, large, painful to the touch, and extending from the bend of the groin to the lumbar region; the thigh on the same side was half bent, and could not be straightened without great pain; the purging was abundant, the motions fluid and very fetid. The patient had not quitted her bed for four months, and sores had formed on the sacrum; she died very soon. On opening the body, besides a great number of ulcerated spots in the colon, we found a purulent sac with greyish parietes lined with a condensed cellular tissue, situated in the thick part of the left psoas and iliac muscles; this took its course along the lumbar region of the spine, and penetrated to the upper and inner part of the thigh, taking the direction of the tendons of the above-mentioned muscles. The muscles were softened and, as it were, dissected by the suppuration; there was no alteration in the bones, nor in the fibro-cartilage of the vertebral column; and the pus was secreted at the very spot where the purulent sac existed.

After child-birth, we often see congestions in one or other of the iliac fossæ; but they appear in the thick part of the round ligaments, following their direction; or they arise in the cellular tissue interposed between the broad ligaments of the uterus, whence they may extend to the whole of the neighbouring cellular tissue, and protrude into the iliac fossæ. Sometimes these abscesses open into the womb; in other cases they penetrate through the parietes of the vagina. I have seen several cases of this kind, and have foreseen this termination; and, under some circumstances, I have been enabled to forestal it by an operation.

Less frequently the pus is discharged through the bladder.

Case VII.—*Immense collection of purulent matter after child-birth, occupying the pelvis, the left iliac fossa, and the upper part of the thigh, opening spontaneously into the bladder, and giving rise, for twelve days, to a large evacuation of pus with the urine. Complete recovery.*—A young woman, a servant, aged 23, was received into the Hôtel-Dieu, on the 6th of July, 1819, and placed in a medical ward, where she was delivered of her first child. Until then she had enjoyed good health, and her pregnancy had given rise to no illness; but a few days after her delivery, she had a shivering fit followed by heat and fever, and complained of swelling of the left leg and thigh. Soon after, she felt pains at the bottom of the pelvis; and they became constant and so violent that the patient was prevented from sleeping. These pains were accompanied by occasional shivering fits alternating with fever, by excessive thirst, obstinate constipation, and complete retention of urine. A thickening was detected in the left iliac fossa, and a hard tumour could be felt, without fluctuation, which was supposed to be developed in the ovary of the same side.

Bleeding, baths, poultices, and emollient drinks were tried without success; the pain and fever continued, and to the constipation succeeded purging, which reduced the patient to a state of extreme debility. She was then removed to a surgical ward, (14th of October), when she was in that wasting condition which usually is the precursor of death. The face emaciated, pale, and yellowish, having the appearance of long suffering; eyes dull and hollow, skin dry and cadaverous, voice feeble and languid, continued fever, increasing towards evening, and copious diarrhœa. Moreover, there was a broad, fluctuating swelling in the left iliac fossa, seeming to raise up the crural arch, accompanied by œdema and retraction of the thigh, the movement of which was painful, and extension impracticable. Poultices were applied, and astringent drinks prescribed.

On the fifth day the patient discharged from the bladder such a quantity of purulent matter, that it exceeded the quantity of urine that was passed with it. This evacuation continued for twelve days, during which time the swelling in the iliac fossa diminished, and at length disappeared, the pains and diarrhœa ceased, the fever decreased, and the appetite returned. A short time after, a point of fluctuation was observed above and in front of the left thigh. I opened it, and a large quantity of pus was discharged; this soon assumed a serous character, which usually precedes the adhesion of the parietes of an abscess; the wound healed, and the patient left the hospital perfectly recovered, forty-five days after her admission to the surgical ward.

We rarely meet with such immense sacs of matter, and still more rarely see them terminate so favorably. The cellular tissue near the bladder and the rectum appears to have been the seat of this abscess, whence arose the constipation and dysuria which happened at the same time.

The cellular tissue of the left iliac fossa also took part in the suppurative process, and by degrees this suppuration extended behind the crural arch to the upper part of the thigh. To this extension of the disease we must refer the presence in the iliac fossa of the hard and afterwards fluctuating tumour, also the retraction of the thigh on the pelvis, and the œdema of this part of the limb.

The long retention of the pus within the tumour was followed by hectic fever, which brought the patient to the verge of the grave, when suddenly the urine became purulent: this plentiful evacuation was coincident with the subsidence of the tumour, the decrease of the fever, and the cessation of the other symptoms. Thus the parietes of the bladder were perforated, and by this channel the purulent matter found exit with the urine; an extraordinary event, and the more so as showing the efforts of nature under the most desperate circumstances.

In some cases the iliac fossa may contain purulent collections, the source of which may be in a distant part; such are symptomatic abscesses, accompanying caries of the bones or inflammation of the neighbouring ligaments. The pus then burrows along the course of the psoas and iliac muscles; it is deposited in a fluid form in the iliac fossa, and the tumour to which it gives rise is soft and fluctuating from the first; a circumstance which will sufficiently distinguish the latter from the tumours previously described.

Errors of diagnosis may occur. Thus I have known this inflammation mistaken for internal strangulation, and for hepatitis, as happened with young B——, to whom I was called in by the late J. Ray; also for metritis, or peritonitis, as I witnessed in the case of Madame B——, of Pontoise. In these two cases, the precise circumscription of the disease to the right iliac fossa, the retention of fecal matter, and a just appreciation of the other symptoms which were present, retrieved the error; and the evacuation of the pus, almost at the moment predicted, confirmed the correctness of the diagnosis.

The prognosis generally is not very serious, for out of sixteen very different cases, one only proved fatal. When the symptoms give way quickly to the means used, when the bowels act freely, when the fever disappears and the tumour diminishes, a speedy recovery may be looked for. On the other hand, when the symptoms continue, when the gradually increasing tumour becomes the seat of fluctuation, at first obscure but gradually becoming more perceptible, and of throbbing and shooting pains, it may be expected that the pus will be voided by the anus. And in these cases the prognosis is not unfavorable; for it has been shown by experience that recovery is as complete as when the disease ends in dispersion. It is probable that in this case a mucous conduit is formed, which, in its organization, progress and termination, is very similar to the artificial mucous canals which I have described in speaking of the symptomatic abscesses which accompany caries of the vertebral column. If general peritonitis supervene, a fatal termination may be apprehended, because the development of this disease is a sign of the rapid increase of the primary affection; and the two united are beyond the resources of art.

The treatment should be at first conservative, and when called in at an early stage, it is generally practicable, if not to prevent the formation of the tumour, at least to stop its progress. When pain in the iliac region is accompanied by alternations of diarrhœa and constipation, when you can detect by the touch a deep and ill-defined swelling, the symptoms will generally yield to local bleeding, emollients, and gentle laxatives, in the form of drinks or injections. Absolute rest, frequent and long-continued baths, will be efficacious, and a spare diet is indispensable. If the tumour should already have attained some size, it must be prevented from increasing by local and general bleeding. With a robust patient, if the febrile action be strong, bleeding at the arm may be practised at once; then a great number of leeches may be applied in front of the tumour, which may afterwards be covered by a large poultice; emollient injections should be administered morning and evening, and the patient should take veal broth with sulphate of soda or magnesia. Oily juleps should be taken during the night. The leeches should be repeated as often as the state of the pulse, the strength of the patient, and the amount of inflammation in the tumour, seem to require them.

When the diminution of pain and the decrease of the tumour testify to the dispersion having commenced, it should be encouraged by emollient applications, rest, and regimen.

If the tumour, on the contrary, retain its size and sensibility, notwithstanding all appliances, fluctuation will soon be manifest, and afterwards become more distinct. Absorption should then be encouraged, continuing the antiphlogistic treatment if the state of the patient will admit of it; otherwise, applying topical emollients, until the bursting of the abscess. Some patients have then found relief from the use of laxatives, which gently stimulate the action of the bowels, and encourage the evacuation of the pus. If peritoneal inflammation appear likely to ensue, the necessary means must be adopted to combat it.

SECTION X.

ON CENTRAL LACERATION OF THE PERINÆUM DURING PARTURITION, AND THE BIRTH OF THE CHILD BY THE RENT.

Laceration of the posterior commissure of the vulva, extending more or less into the perinæum, is a very common accident in child-birth. It is a very simple lesion, which seldom requires surgical assistance. But it sometimes extends to the inferior extremity of the posterior wall of the vagina, and the whole length of the perinæum, including the sphincter ani, and the anus itself partially; it may then be considered as amongst the most serious surgical cases, on the treatment of which I may take another opportunity of enlarging. On the present occasion, I shall confine my observations to central perforation or laceration of the perinæum, without injury to the commissure of the vulva or the sphincter ani; and the birth of the child by this accidental opening.

There are accounts of many cases; nevertheless, certain writers, whose opinion in obstetrics is of high authority, consider a birth of this kind to be mechanically impossible, from the disproportion between the dimensions of the perinæum and the size of a full-grown child; and, therefore, they infer that the cases reported are imaginary, and undeserving of any confidence. It is, indeed, difficult to conceive, at first sight, how a part, not usually exceeding eighteen lines in extent, can be so far stretched as to admit of the passage of a child. But such reasoning is almost an insult to nature; for daily occurrences come under our observation, of which the causes and mechanical details are totally beyond our comprehension. If facts can be proved, the ways and means by which they are brought about are but a secondary object, though, at the same time, they should not be neglected. One case, of recent occurrence, and of which an account will be given, can leave no doubt in the minds of the most sceptical, and will corroborate previous records on which some doubts have been thrown. The earliest case known did not occur in a woman, but was witnessed, by the immortal Harvey, in a white mare belonging to the Queen of England, which had been rung to prevent her being covered by a horse. But, in spite of this precaution, or because it was taken too late, the mare was impregnated; and the foal, being unable to escape by the vulva, was expelled through the perinæum.

In 1778, Nédey, a surgeon of Besançon, sent to the Academy of Surgery a case, in which a full-grown child had passed through a ruptured perinæum, without lacerating the commissure or the sphincter ani. This case, which excited the astonishment of the Academy, would be doubted, says Baudeloque, only by those who are ignorant of the state of distension which the perinæum is capable of at the period of child-birth.

The following is an extract of the well-known case of Coutouly. This eminent accoucheur was sent for, on the 13th January, 1788, to attend Madame de la Luizerne, aged 25 or 26, whom he had attended the year before, when she gave birth to twins at five months and a half of pregnancy. This woman, says Coutouly, was in strong labour, and the head of the child pressed against the perinæum, which was so much distended, that my whole aim was to prevent its laceration. But every precaution was useless; the central part of the perinæum gave way; and the head being pressed violently against my hand, I was compelled to allow it to pass through the opening; the body followed, and, immediately afterwards, the placenta. I then sought to ascertain exactly what had happened. An inch above the anus, towards the centre of the perinæum, there was a torn aperture, from which two lacerations extended,—one, following the direction of the raphe, had stopped at a short distance from the vulva, and the other deviated to the right, forming a wound not unlike the letter Y. Neither the sphincter ani, the rectum, nor the posterior commissure had been injured. The wound healed up in the course of five weeks.

Thomas Denman, in his '*Introduction to the Practice of Midwifery,*' cites a case of rupture of the perinæum similar to the last, in which the child passed through the perinæum contiguous to the anus, the latter as well as the front of the perinæum remaining uninjured. The parts were united in six weeks, and the same woman was brought to bed afterwards without any accident.

On the 14th of December, 1812, Dr. Joubert, of Rouen, was called in, at six o'clock in the evening, to a lady, aged 23, who had reached the ninth month of her first pregnancy. The head of the child was presented in one of the three last positions. The labour was slow, and the delivery did not take place till the evening of the 15th, by the rupture of the centre of the perinæum, which was distended to the extent of at least five inches. The after-birth also came away through the wound. It healed in five weeks. This woman became pregnant a second time, and was brought to bed naturally three years afterwards, without the slightest accident. ('Journal de la Société médicale d'Emulation').

Meckel, in the '*Neues Journal für die Chirurgie, &c.,*' vol. iv, 1811, has reported a case of central laceration of the perinæum, and parturition by this aperture, without injury to the vulva or the sphincter ani. It was the woman's first child, and the wound healed quickly. Gravis and Lebrun, in the *Annals de la Médecine physiologique*, for July, 1825, have given a case of parturition by the perinæum, without injury to the vulva or the sphincter ani. In 1822, Dr. Merriman attended a woman at a first birth. The labour proceeded quickly, and the perinæum was excessively distended by the head of the fœtus. He supported it with the palm of his left hand; when he suddenly felt something slip past his hand: it was the fœtus, which had been expelled through a lacerated opening. The placenta was brought away a few seconds afterwards by the natural passage. The anus and the posterior commissure of the vulva were not injured. The mother got well, and was afterwards confined without any accident ('Synopsis,' &c., 4th edition, 1826).

An account of a similar case has been given by Dr. John Douglas in the 'Dublin Hospital Reports,' &c., vol. iii, 1822. He was called to a woman in labour, and found the child on the point of passing through a laceration of the perinæum, the head resting against the side of the left thigh, and inclined backwards. A strong uterine contraction sufficed to expel the remainder of the body. The perforation comprised the lateral portion of the perinæum, part of the integuments of the left thigh, and the corresponding labium: the lower commissure was not divided. The umbilical cord was withdrawn by the vulva, but the placenta came away through the wound. It was found necessary to cut through the stricture formed by the posterior commissure of the natural outlet, as it became gangrenous. The recovery took place readily.

On the 21st of May, 1824, Marter, a surgeon of Königsberg, was hastily called to a woman, aged 25, in her first labour. The midwife told him that the child was passing by the rectum; and it appeared indeed, at first sight, as if the anterior wall of the rectum, and the posterior wall of the vagina, had been torn at the same time as the perinæum, and that the fœtus was about to be expelled through the opening. The vertex presented at this abnormal opening; it was useless to attempt to return it into the vagina. The child was expelled through the wound after a few strong contractions, without any injury to the vulva; the after-birth followed soon afterwards by the same opening. After the delivery was finished, Marter found that the anus and the sphincter ani were also uninjured. The rupture commenced immediately in front of the anus, extending in the direction of the raphe to within an inch of the vulva. Corresponding with this was the rupture of the posterior wall of the vagina, which also terminated in front an inch behind the vulva. In the middle of the perinæum there were also two transverse lacerations, so that the wound was of a crucial form. There was about an inch of skin remaining between the posterior commissure of the vulva and the anterior extremity of the longitudinal rupture of the perinæum.

Considerable hemorrhage took place shortly after the delivery, which was soon stopped by cold applications. But the perinæum became the seat of a considerable inflammation and swelling, which it required a fortnight to reduce. On the sixteenth day a suture was applied, so as to keep together the four angles of the wound. Union did not take place for a long time, and the woman was afflicted with a vagino-perinæal fistula, by which the menses passed for two years. In 1827, she was delivered again very quickly, and in the natural way. (*'Rust's Magazine,' &c.*, vol. xxvi, 1828; and *'Siebold's Journal für Geburtshülfe,'* vol. ix, 1839).

In the following case, extracted from Moschener's work ('*Conspectus partuum in Lechodochio pragensi, &c.*,' Prague, 1826), and which will also be found in the above-mentioned volume of Siebold's Journal, the child came away through the perinæum, after gangrene had taken place in consequence of great and prolonged distension, the vulva being at the same time very narrow. In 1823, a woman aged 35, pregnant for the second time, came to the lying-in hospital at Prague. The liquor amnii had been escaping for six hours, and the pains, which were very severe at the beginning, had ceased for half an hour; when the top of the head of the fœtus was found to be lodged in the vulva, which was rounded and very narrow. The perinæum, very much distended and pressed down, was attacked with gangrene from the anus to its centre. There was a communication between the rectum and the posterior part of the vagina, and by introducing the finger into the rectum, it just touched the face of the fœtus. The lower commissure had been lacerated two years previously at the first accouchement, and presented a hard, resisting cicatrix, which was ascertained by Professor Jungmann to be the principal obstacle to the present delivery. He determined on seizing the head with the forceps, incising the cicatrix, and extracting the child by the dilated vulva; but he had scarcely introduced one blade of the instrument, when there was a large discharge of sanious fetid pus; the contractions came on again immediately, and the head made its way through the sloughing perinæum; the body soon followed, and the after-birth eight minutes afterwards. In two months the patient was sufficiently recovered to be able to quit the hospital; but it is not stated in what condition the injured parts were at that time.

There is also a case in '*Der neue Chiron*,' vol. i, 1822, published at Sulzbach, in which Dr. Franck gives an account of a perforation of the perinæum behind the posterior commissure of the vulva, through which the left arm of the fœtus made its way; the head came by the vagina, and the child was at last extracted by the vulva. This case is merely mentioned owing to its peculiarity, but it proves nothing on the point in question. It may be well, however, to report the principal details of a case which occurred in the private practice of M. Evrat. This case was published in the '*Revue Medicale*,' June, 1830, and formed part of a memoir read at the Academy of Medicine by M. Moreau, who attended the patient from the period of the accident until her complete recovery.

CASE I.—*Fourth position of the head. Central laceration of the perinæum. Recovery.*—Mme. D——, aged 19, living at Paris, having arrived at her full time in her first pregnancy, sent for M. Evrat, on the 3d of March, 1815. The presentation was in the fourth position of the head, which came down into the pelvic cavity without much trouble; but when it was on the point of passing through the lower strait, there was some obstacle which prevented it from getting below the arch of the pubes.

During a very strong pain, M. Evrat thought he felt the perinæum, against which he held his hand, sensibly give way before the pressure of the child's head. Whilst thinking what was best to be done, a violent pain expelled the child through a laceration of the perinæum, leaving the commissure of the vulva and the orifice of the anus uninjured. The irregular wound resulting from this perforation extended to the right, in the direction of the ascending ramus of the ischium and the descending ramus of the pubes. It passed, in front, rather beyond the posterior commissure of the vulva; and behind, a little round the anus, and then transversely, from right to left, between the anus and the vulva, to near the tuberosity of the ischium on the left side. The placenta came away soon after, by the same opening. On passing the finger into the anus, it was ascertained that it was not injured.

M. Evrat, being obliged to go to England, M. Moreau, with Professor Désormaux, had charge of the patient until she had quite recovered. The treatment was very simple. The patient was ordered to lie on her side, with the legs and thighs close together, and half bent; the wound was dressed with lint, and she was kept on a spare diet; the bowels were kept open by means of injections and gentle purgatives, for fear the passage of any hard matter should interfere with the healing of the wound, or burst it open again. She pursued this course with great attention, and in five weeks she was quite well, and the wound was completely healed.

This lady has since had a second child without any accident, except a slight laceration at the posterior commissure, which very often happens in first deliveries.

No one can, I think, dispute the truth of the foregoing statement; but I will give an analogous case, which occurred recently under my own observation, and which is not less conclusive; I will then proceed to the practical considerations on the causes and treatment of such accidents.

CASE II.—*First position of the head. Central laceration of the perinæum. Suture of the wound. Rupture. Recovery.*—Mrs. B——, aged 38, of middling height and well formed, had been married about a year, and, being pregnant for the first time, she felt the pains of labour on the morning of 3d of September, 1832. The child's head was presented in the first position; and the labour proceeded quickly till the head appeared at the vulva, which was very narrow. Four hours after the labour commenced the patient had two very violent pains, and the midwife felt the perinæum, which she was supporting, give way. Nearly at the same moment, the head and body of the fœtus passed through this abnormal opening. It may be added that the patient was placed immediately opposite a window, therefore the sexual parts were clearly seen, and the midwife was able to give a good account of what happened. The umbilical cord being tied and cut, she gave the child to an attendant, and proceeded to complete the delivery. The umbilical cord was hanging between the lips of the wound, and the placenta was engaged in the same aperture, by which it was also brought away; there was no hemorrhage. The child was of middling size, and is now alive and well.

In her first fright, the midwife sent for an accoucheur; but, perceiving that her patient was going on well, and was not aware of the accident, she told the doctor that it was all over, and did not say anything about the laceration.

All went on well for two days, but an injection which she administered having come away immediately, she was fearful that the anus was lacerated; and she even fancied that part of the injection returned through the wound. She felt obliged to confess what had happened; but some days passed without any fresh occurrence. The child was sent to nurse.

On the tenth day, M. Guersent, jun. was consulted. He first tried astringent lotions, and touched the parts with caustic; and at length, on the twelfth day, he brought the edges together with a twisted suture; the bights of the thread were held by two ends of a probe. After five days had passed, the edges of the wound appeared to have united, except a small fistulous opening near the rectum, and M. Guersent removed the suture. The union of the parts continued for two days, when it was destroyed by some effort of the patient.

She then determined on entering the Hôtel-Dieu, on the 6th of October, when the parts were found in the following condition. The skin of the abdomen presented the usual appearance noticed in women recently delivered; the pelvis was of the usual dimensions, and the sexual parts were scarcely at all swollen. On separating the labia and nymphæ, the aperture of the vulva was perceived to be very forward; a circumstance of some importance, as it explains the difficulty she experienced in sexual intercourse. At the back of this opening was another of an irregular circular form, capable of admitting the ends of the three fingers; it was situated a little to the left; and between the two apertures was a fleshy commissure about the substance of the little finger. Behind this second opening was a third very small one—the anus; and lastly, there was the os coccygis, which was not much prolonged in front, as some accoucheurs have affirmed to be the case where the perinæum is lacerated.

Here is a case in which all the details are well confirmed; the midwife attended throughout the delivery, and what she saw has been seen also by Siebold, Moreau, and many others. And yet when Coutouly, a man much respected for scientific attainments, reported an analogous case, it was alleged that he was frightened, and had seen imperfectly. Even admitting that such a man could be alarmed, this must have happened after, and not before the accident.

But it may be said, how can such a case be imagined? A sufficient answer is, that it has taken place; and it is not so difficult of explanation. They who have seen first accouchements, in which the vulva is dilated with difficulty, and the perinæum has such a tendency to stretch and yield, have no doubt been in dread lest the head of the fœtus should force its way through the latter. Further, I have reason to believe that this accident is not so unfrequent as has been represented; but in most cases the vaginal commissure is ruptured, and thus the accident is called laceration of the fourchette.

Let us now see what may be the causes of a delivery taking place in this way.

Persons who pay especial attention to anatomy, to accouchements, or to affections of the genito-urinary organs, must frequently have seen the vulva or external orifice of the vagina in an elevated position towards the pubes, whilst the perinæum, from before backwards, is very long. The vulva appears, in such cases, and is, in fact, very narrow; and they who are not acquainted with this condition of the parts, judging of the diameter of the vagina by that of the external orifice, consider the vagina ill-formed, and are alarmed at the chances of an accouchement. But it is not so; the narrowness is only in the vulva, whilst the vagina is of the usual size. This narrowness arises from a prolongation of the perinæum, which curtails the orifice of the vulva by a quarter, a third, and even sometimes one half its ordinary dimensions. In examining the internal organs of women who are thus formed, it is necessary to carry the finger obliquely downwards and inwards, in a line which forms more or less of an acute angle at its junction with the pubes; and the same precaution is to be observed in the use of the speculum, instead of introducing it horizontally, as in ordinary cases.

This vice of conformation gives rise to many inconveniences. Sometimes it is so exaggerated, that sexual intercourse is impracticable, until the vulva is enlarged downwards with a bistoury. The catamenial secretion is discharged with difficulty from the vulva, and lodges partially behind this sort of pent-house formed by the prolongation of the perinæum; it is the same with leucorrhœal discharge. But in accouchements and in operations on the neck of the uterus, this formation is particularly inconvenient. It may easily be imagined what an obstacle such a condition of the parts will present in parturition. The head of the child meets the greatest difficulty in forcing its way through the lower outlet, and rests upon the perinæum; and if the posterior commissure of the vulva offers less resistance in proportion than the centre of the perinæum, the child cannot make its way through the orifice, without producing a more or less extensive laceration, which the accoucheur cannot possibly prevent. If the commissure, on the other hand, should be very strong, the centre of the perinæum will yield, and the child will be expelled by this abnormal aperture. We have no doubt that most of the perinæal accouchements of which I have given an account, have arisen from this cause.

This vice of conformation may be congenital, or accidental: that is, by union of the soft parts in consequence of burns, of laceration in a previous accouchement, or any sort of wound. It is clear that the only remedy is to cut through the constriction to a proper extent, to order the patient to be quiet, and to watch particularly that no fresh adhesion takes place in the healing of the wound. These means should be adopted especially in the case of a woman pregnant for the first time, if it could be known in time to allow the cicatrix to become firm previous to the accouchement; it may, indeed, be done without hesitation during labour, if it be clearly seen that the delivery cannot be accomplished without a serious laceration, or perforation of the perinæum. Dr. Champenois has reported, in the fourth volume of the '*Journal général de Médecine*,' the case of a young woman, in whom he prevented this perforation by cutting, with a bistoury guided along a grooved director, through a hard, thick, callous cicatrix, resulting from a burn of the external parts, which she had suffered from when a child. The cicatrix had contracted the vulva in a singular manner, and the resistance which it offered overcame all the efforts of the patient, and all other means tried during the labour. Dr. Buet has inserted in the thirty-ninth volume of the '*Journal complémentaire des Sciences Médicales*,' a curious case of accidental constriction of the vulva.

CASE III.—*Accouchement. Laceration of the labia and the perinæum.*—A young girl got into trouble, but she concealed her pregnancy, and delivered herself without assistance. The labour was most painful, and gave rise to extensive laceration of the labia and the perinæum. Union took place, but to such an extent that the orifice of the vulva was reduced to a small opening into which the little finger could scarcely be introduced. She afterwards married, and it was necessary to call in a surgeon, to whom she had confided her secret. The orifice was enlarged, by incision, in proportion to the diameter of the vagina; the woman was kept quiet; tents of lint were placed between the edges of the wound to prevent any new adhesion, and it very soon healed. I shall presently narrate the particulars of a similar case, which occurred in my own practice.

If this prolongation of the perinæum should exist, there is an additional circumstance which may have great influence, namely, the position of the woman whilst in labour. In the case cited by Nédey, perceiving that the pains diminished, and that the woman wished to go to stool, the midwife turned over a wooden chair, between the legs of which she placed a chamber utensil, and the patient was seated on this new kind of close-stool. In this position the pains returned, the child was heard to cry, and was withdrawn from beneath the chair. A patient, now under treatment in the hospital, was in a similar situation; she was so raised up by pillows, that she was almost in a sitting posture. In such a position, the head of the child, pressed downwards and backwards by the arch of the pubes, must come with much greater force against the perinæum. It is moreover ascertained experimentally that the child is presented in a much better position at the lower opening of the vagina, when the woman is lying horizontally. Another cause may be too great a curvature backwards of the inferior extremity of the sacrum and the coccyx, or, which is the same thing, too great a prominence of the sacro-vertebral angle. This vice of conformation,—by enlarging the coccy-pubic diameter of the perinæal outlet, by carrying too low and too far back the axis of this passage, and by diminishing the inclination of the plane in which the head of the child should be directed forward beneath the symphysis of the pubes,—forces it to remain longer in the perinæum, and brings it with increased violence against this part. In fact, a great many other causes might be assigned as tending to such accidents, depending on some malformation of the pelvis, or the position of the child's head; but it is far better to be guided only by facts; and it is a matter of regret that authors, who have given the cases we have alluded to, have not detailed all the particulars relative to the child and the mother, which might have helped to solve the difficulty.

I will now come to that which is of the greatest interest, the remedies to be employed in such cases of central laceration of the perinæum. In the patient now under treatment, an attempt at union was made with the twisted suture; and it did not succeed because it was removed too soon, and was not applied till the tenth day. In recent wounds, union may take place in four or five days; but in suppurating wounds, much longer time is required. And this extension of time was still more important in the present instance, as the lochial discharge was acting on the wound, and interfering with the adhesive process.

I have very often had occasion to apply sutures to suppurating wounds, but they required a much longer time than recent wounds. Lacerations of the perinæum in child-birth are of the former kind. The following is a case which I will give from memory.

Case IV.—*Laceration of the perinæum. Suture. Contraction of the vulva.*—Many years ago I was called in by M. Gardien and another medical man, to see a young girl who had been secretly brought to bed away from her home. The delivery had given rise to a rupture of the perinæum, extending to the anus, and involving about an inch of the anterior wall of the rectum. Several days had elapsed since the accident. I recommended and applied the interrupted suture; I should now prefer the twisted suture. A month afterwards, the young girl was obliged to return to her home, and the union was not yet accomplished; this was delayed by continued suppuration. I had not cut the threads, nor had the threads cut the flesh. My advice was to leave the suture in its place, as I felt assured that the union would take place, and I heard nothing more of the case.

Three or four years afterwards, a man and woman came to my house; and the woman, keeping rather in the back ground, made a confidential signal to me. The man, who was her husband, informed me that he had been unable to consummate the marriage, and he wished to know whether it was his or his wife's fault. I examined her, and found the aperture of the vagina very narrow, situated high up towards the pubes, and directed forwards; behind, the perinæum presented a firm and long cicatrix. I advised the husband to make another attempt, which was successful. The woman became pregnant, and was delivered without any fresh laceration. It will have been conjectured, no doubt, that this was the same woman on whom I had operated some years previously. I learnt that she had confided her secret to a medical man, who removed the suture when the union was complete.

In the case, however, which gave rise to the foregoing remarks, what was to be done? After refreshing the edges of the wounds and bringing them together with a twisted suture, it might be left to take its course; or it might be necessary to cut through the fleshy part which separated the wound from the vulva. Before taking either of these steps, however, I determined to make the patient lie on her back, with her thighs drawn close together by a bandage, desiring her not to move from this position. She had remained in this posture about ten days, when I perceived a sensible diminution in the diameter of the abnormal aperture, the edges already adhering at some spots. There was every reason to hope, therefore, that the union would be accomplished without any operation.

This woman left the hospital on the 30th November, quite recovered. The whole surface of the perinæum was cicatrized, and though there might still be some separated parts at the surface of the vagina, as far as its junction with the perinæum, these would, no doubt, soon close up.

This case fully confirms what many authors have said, as to the practicability of curing such solutions of continuity without any operation. It has been seen, in the cases reported, that patients recover in five or six weeks, which also happened in the present instance. I recommended her not to engage in any work to fatigue her, to walk as little as possible, to avoid sexual intercourse, and everything else likely to destroy the adhesions, which were not quite firm. I requested her to come to the hospital from time to time, and not to fail in doing so if she should again become pregnant.

SECTION XI.

ON VITAL AND MECHANICAL DILATATION OF THE URETHRA.

THE most opposite opinions have been entertained respecting stricture of the urethra, and the treatment has been as various: of this any one will be convinced by merely casting his eye over the long list of authors who have written on the subject. I do not intend to give a complete account of these diseases, nor of the means proposed to cure them; but I shall confine myself, for the present, to the case of a patient in the hospital, by which I shall be able to exemplify the improvements that have been introduced into this branch of our art.

This man was a coachman, aged about 40; and he was getting up to his seat when his horses suddenly started, and he fell astride upon the wheel. He immediately felt great pain in the perinæum, and lost a considerable quantity of blood by the urethra. Being unfit to continue his employment, he came to the Hôtel-Dieu, in March, 1832, with the following symptoms: swelling of the parts which were the seat of the contusion; acute pain all along the passage; the skin of the penis, the scrotum, and the perinæum, extensively ecchymosed; and he was unable to pass his urine. On questioning him, it appeared that he had had gonorrhœa several times, that he had frequent desire to make water, and that it did not pass readily.

The accident that he was suffering from did not admit of a doubt; a catheter was introduced, but it would not penetrate more than three inches. A fine bougie was then tried, but without success. It appeared, therefore, that there were two lesions; stricture, and a laceration, of the urethra. It was necessary to remove or dilate the first; and, if the second were left to itself, the healing would, almost to a certainty, be accompanied by contraction. It was, undoubtedly, a case of great difficulty; and in twenty or thirty similar cases, I have always met with great obstacles in their treatment. To avoid contraction, it was necessary that the cicatrix should be formed on a catheter of the largest size.

About five months ago, a person, engaged in some family quarrel, had provided himself with a pair of pistols, which he carried at his waist. In falling, one of the pistols went off, and the ball passed through the urethra, pierced the testicle, and lodged in the thigh. If any one was ever exposed to the risk of stricture, it was this man. I introduced a catheter into the urethra; in three months, the wound was quite healed, and he has passed his water since quite freely. The only consequence was atrophy of the testicle.

But to return to the patient before us. It is evident that the previous stricture, from which he was suffering, required dilatation; and that a catheter was necessary, on account of the laceration. These means were tried, but the instrument at first would not pass. I recommended the attempt to be repeated every hour; and on the following day the catheter had made way, and the patient passed his water. Three days afterwards, a middle-sized catheter was introduced into the bladder.

It was formerly considered necessary, in cases of stricture, to force the obstruction, so as to enable the patient to make water; such was the practice of Desault; and there appeared to be a sort of triumph in overcoming every obstacle. I do not hesitate to say, that, out of ten cases so treated, one half of them would suffer from laceration of the urethra, false passages, swelling of the penis, infiltration of urine, or gangrenous inflammation; and that death itself might often be the consequence of such imprudent measures. Force must, therefore, be considered improper, not only on account of the pain, but of the danger of the proceeding; and I think I have done good service in changing the system which formerly prevailed in this hospital. When the consequence of a stricture is limited to difficulty in passing water, force should be avoided; and I have learnt from experience that it is best to temporise. Force should be resorted to only when retention might give rise to rupture, infiltration, or inflammation, putt the life of the patient in danger. The observations made at the Hôtel-Dieu prove, that, out of thirty cases of stricture, it is not necessary to proceed to violent measures in more than one at most; in the other twenty-nine cases, several hours, if not days, may be allowed to elapse. I have followed this plan for eighteen years, and always with success.

Let us recur to our patient. He had had gonorrhœa three or four times, which gave rise to stricture; the contusion of the perinæum and the laceration of the passage had produced retention of urine. I did not use any force, yet I succeeded in penetrating to the bladder; and, on the third day after his entrance into the hospital, I was enabled to introduce a middle-sized catheter; whereas, on the first day, I could not pass the smallest bougie. The contact of the catheter gave rise to an abundant secretion of mucus, which increased still more on the following day; and at length, on the third day, a catheter ten or twelve times as large at its extremity as that tried on the first day, passed the obstruction. As a general rule, therefore, no force should be used when you can wait some hours, and still less when you have some days before you. It is sufficient to introduce a bougie or a catheter, and to fix it at the spot where it will go no farther. I have named this method, gradual or *vital dilatation.*

I may here remark, that, where there exists contraction without laceration, and the urine flows between the catheter and the parietes of the urethra, it is a favorable sign, as its passage tends to increase the dilatation; in such case, the catheter should be closed, to encourage the flow of the urine by its side. But, if the passage be lacerated, the passing of the urine may give rise to infiltration, and urinary or sloughing abscesses; in which case the urine should not be allowed to remain in the bladder, and the catheter should therefore be open, the patient lying on his back.

That plan of proceeding, therefore, by which stricture is overcome patiently and gradually, is the best in the great majority of cases; but there is also another mode of treatment, of which I shall speak hereafter, and which I have distinguished as *mechanical dilatation.*

I will cite the following case, especially as it may be considered the first in which I adopted the method I recommend.

CASE I.—*Stricture with dysury, treated by vital dilatation.*—About eighteen years ago, I was called in by a rich man of excessively nervous and excitable temperament, who was suffering from difficulty in making water. I advised him to keep a bougie in the urethra, but the mere proposal alarmed him, and he had all sorts of exaggerated ideas about the pain and inconvenience of such treatment, affirming that it must injure him, and that it would altogether stop the passage of urine, which he could void only *guttatim*. After some explanations, which gave him encouragement, he consented to allow me to introduce a bougie with a rounded extremity; but it had scarcely entered the urethra when all his apprehensions returned; he wished me to withdraw it, and I had much trouble in prevailing on him to keep it in. I inserted it as far as the obstruction, but I there found an insurmountable obstacle, and the patient showed so much apprehension, and complained so much of pain, that I thought it best to desist for the present; but I fixed the bougie where it was, that is, against the stricture. The patient only consented to this on condition that I would see him every two hours, to withdraw it if necessary. After a few hours had elapsed, I paid him another visit; he had voided urine without pain, and the bougie easily passed the obstruction. A few hours later I inserted it still farther, and in the course of the day I reached the bladder. A few days afterwards a larger one was substituted, and subsequently the treatment was continued in the ordinary manner, by gradually increasing the size of the bougies, the dilatation making rapid progress. In a fortnight the patient passed his water with ease, without pain, and in a full strong stream.

This case was not lost upon me; I perceived that dilatation of the urethra might be effected without forcing a bougie into the contracted part, and, moreover, I foresaw that it would be an advantageous mode of proceeding with faint-hearted or susceptible patients, as well as in all cases in which the necessity for introducing a bougie immediately is not imperative. Since the above instance, I have pursued this plan with numbers of patients, as will be seen by the hospital registers. In the following two cases a similar plan of treatment was adopted.

Case II.—*Stricture of the urethra. Dysury and incontinence of urine. Vesical catarrh symptomatic of the stricture. Vital dilatation.*—Castiaut, aged 49, was admitted into the Hôtel-Dieu, on the 20th of February, 1827. He complained of being unable to pass his water, except by drops, even with great effort; also that these efforts were frequently followed by an involuntary discharge. He experienced great pain in the hypogastric region, the perinæum, and the urethra, especially during the passage of the urine; and he compared the pain to the sensation of a red hot iron passing along the canal; this did not continue long after the urine had passed; the water when cold deposited a mucous and purulent sediment. This man had had eleven attacks of gonorrhœa, the last of which had continued four years; and it was at the period when this discharge ceased that he found difficulty in passing his water; the stream diminished in volume, did not flow straight, became filiform, and in three years he was unable to pass his water at all. Dilatation was then employed, and for six years he was relieved, until six months ago, when the dysury re-appeared. A bougie was introduced into the urethra, which penetrated to the bulb, where it was arrested by a hard resisting stricture; no effort was made to force it past this obstacle; but it was left in the urethra for four and twenty hours, when it penetrated with ease into the bladder. An elastic catheter of small size was then substituted. The patient suffered no pain. Four catheters were successively used of gradually increased dimensions, being left each time in the urethra; and in thirty-two days the patient made water with ease, and in a large stream. He quitted the hospital quite cured.

Case III.—*Contraction at the commencement of the membranous portion, accompanied by extraordinary spasm, of the urethra, and incontinence of urine. Dilatation.*—Colomb, aged 36, of good constitution, was admitted into the Hôtel-Dieu, on the 6th of February, 1827. He had had gonorrhœa but once, but it had lasted ten years. Six or seven years since, when it entirely ceased, he perceived that the stream of urine diminished by degrees, till at last, four or five months ago, he passed his water only by drops, and with considerable effort; after this exertion the urine continued to flow involuntarily, and he was unable to stop it. On the 7th of February, a catheter of medium size was introduced into the passage, and it penetrated to the fore part of the membranous portion, where it was arrested by a hard stricture, which the catheter could not penetrate, whichever way it was turned. A bougie was fixed in front of the obstruction, but the patient withdrew it an hour afterwards. In the afternoon an attempt was made to introduce it again; but the urethra was in such a state of spasm, that it could not be made to penetrate beyond the fossa navicularis, and it was so tightly grasped by the sides of the canal, that some force was required to withdraw it. On the 9th of February I tried a silver catheter of medium size, and then a small one, but both were stopped in the fossa navicularis, and grasped with the same force as the bougie had been two evenings before. The end of a catheter, rounded at the extremity, was introduced, and fixed in the fossa navicularis; at first it made but little way, but in four and twenty hours it had penetrated; it was replaced by an elastic catheter of medium size, which was fixed, and the dilatation was continued for twenty days. Three catheters were successively used, the last being of the largest size. The patient passed his urine freely, and in a large stream, when he quitted the hospital.

These two methods of dilatation have each their different mode of action; mechanical dilatation operates by continued pressure from within on the parietes of the obstruction; vital dilatation accomplishes the distension either by exciting a sort of expansive force, or by determining a secretion of mucus, and, consequently, by relieving the congestion of the parts.

Vital dilatation is so potential, that catheters are often found to penetrate to the bladder in two or three hours; and its action is facilitated by occasionally turning the instrument in the passage. This process does not require catheters of any peculiar form; one of silver or of india-rubber, or a bougie, whether the extremity be thin or thick, may be used indifferently for this purpose. I give the preference, however, to elastic gum catheters, or bougies, with a rounded blunt extremity, and of a length proportioned to the depth of the obstacle. They have a smooth surface, bend easily, and accommodate themselves to the shape of the urethra, without incommoding the patients in their movements.

Whatever instrument may be used, it is to be introduced as far as the obstruction, and fixed there by the usual means. No endeavour need be made to thrust it into the strictured part, for, by remaining a certain time in the urethra, it will have the desired effect. In fact, in a few hours, or, in worse cases, in a few days, it will assuredly pass the obstacle without any difficulty, and without force, laceration, or bleeding. The dilatation is such, that the catheter or bougie will sometimes of its own accord penetrate the contracted part; in other and more numerous cases this is accomplished by a very slight effort; and under other circumstances the dilatation will admit of the introduction of the extremity of a conoidal bougie, which thenceforward must be employed mechanically, as I shall presently explain.

I conceive that there is nothing mechanical in the action of these instruments; and I feel convinced that some vital power must be admitted. But whether it is by a sort of expansive force opposed to the contractile force, and arising from the presence of a foreign body; or whether it is by a secretion which produces a sort of resolution, and thus diminishes the density of the parietes of the obstacle, I will not venture to affirm. I observed at the beginning of this subject, that a secretion takes place which facilitates the passage of the catheter. Let us examine into this, and take, for example, the contact of foreign bodies with the lachrymal puncta. The first effect of this contact is so violent a contraction of the orifices, that a very fine probe cannot penetrate; but when this is repeated or continued, the contraction ceases, and they even dilate, so as to admit the probe which they had previously rejected; at the same time, there is almost always a mucous secretion around these puncta.

The same thing takes place in strictures of the urethra; the first contact of the bougie causes the canal to contract to such a degree, that an effort is required to disengage it, so great is the spasm which it produces; this soon subsides, and in a few hours the bougie may be freely moved. Another circumstance attends the dilatation to which I have already called your attention, namely, a more or less abundant secretion of mucus, and sometimes of purulent matter. This secretion is occasionally so great, that it gives rise to a discharge which may alarm the patient, but which always subsides of itself, either whilst the catheter is in the canal, or after its withdrawal. Under the influence of these two phenomena, the stricture gives way; and after a few hours, or at most a few days, the canal, which at first would not admit a bougie of the very smallest size, will admit one a whole line in diameter.

Vital dilatation is not the only means used to overcome strictures; recourse is often had to another mode of dilatation; which consists in introducing a fine-pointed bougie into the obstruction. This foreign body dilates and separates the opposing tissues by pressure. I have called this *mechanical dilatation.*

The instrument I commonly use in such cases is a conoidal bougie, of elastic gum material; the end being very pointed and almost filiform. From this point it increases gradually in substance to the other extremity, which forms the base of the cone. It is thus fitted to insinuate itself into the smallest opening, and to dilate it as the thicker part is gradually pressed forward. The manufacture of these bougies is of the greatest importance, for if they are badly made, serious accidents may arise.

These bougies are introduced in the following manner: the penis being slightly raised and elongated, and the sides of the glans held between the thumb and the fore finger, a bougie well greased, and held between the thumb, fore, and middle fingers, is inserted into the urethra, and pushed forward by slight pressure, and with a rotatory motion. By this combined movement it will soon reach the obstruction. When it is unable to penetrate this, it bends back upon itself if the least force be used; and as soon as the effort is discontinued, it resumes its previous straight form. These signs, therefore, will be sufficient to enable a practised hand to determine when the point of the bougie has penetrated the obstruction; and such is the tenuity and flexibility of this portion of the instrument, that it cannot under any circumstances occasion laceration, perforation, or any other injury to the parietes of the urethra.

But when the filiform extremity has passed the stricture, the instrument gradually penetrates to a greater or less depth, that is to say, till the bougie, the size of which increases almost insensibly, fills up the opening at the contracted part. When the bougie bends back on meeting an obstacle, without penetrating it, it has always a tendency to escape from the urethra without the least effort; but in the contrary case, when it has penetrated the obstruction, not only has it no tendency to return, but it is forcibly retained by the spasm or contractility of the tissues, to such an extent that some exertion is necessary to withdraw it. As soon as a conical bougie has penetrated a stricture, and has been sufficiently pressed forward, it must be fixed by attaching it to the penis or a suspensory bandage.

In fixing the bougie, the object is to keep it in its place, until it may be practicable or necessary to push it forward with the hand; or to admit of its exercising a continuous pressure against the walls of the stricture. In the first case I do not endeavour to press it forward, but fix the bougie just at the required point. In the second case I bend the bougie, and fix it higher up, towards its base, so that the tendency to straighten itself may exert a continued force against the stricture.

The manner in which these bougies act may be easily conceived. They operate mechanically as a wedge, surrounded by the parts which they are designed to separate; but, whilst a wedge acts only on inert bodies, the bougie operates on living ones, and it exerts not only a mechanical action, but also a vital action, on the parietes of the obstructing body.

In regard to their effect, experience has shown that, when the filiform extremity has once penetrated a stricture, the remainder of the bougie will sooner or later pass forward, however large it may be. In many cases, it may be passed in entirely at once; but in others, it is necessary to wait some hours, or even days; and this is not so much a consequence of the extent of the stricture, or the size of the bougie, as of the variable extensibility of the tissues which form the contraction. This extensibility is sometimes very great, and at others very small. Thus, in some persons, after much trouble in making the point penetrate, the whole bougie will pass at once into the bladder; whilst in other cases, the spasmodic contraction of the tissues offers great resistance; but after a few hours, you will generally find a bougie, that was at first tightly grasped by the stricture, free and moveable; it seldom happens that this does not come to pass in a few days, even in the most severe cases.

The mobility of the bougies, which is observed after a few hours, or at most a few days, is one of the most extraordinary circumstances, and the best fitted to establish the fact, if it admitted of doubt, that what takes place in living bodies, however it may appear to be the effect of mechanical causes, is always more or less dependent on the vital principle; or, in other words, that, in living bodies, the vital principle is mixed up with mechanical phenomena, which it changes and modifies according to rules which are beyond the power of physical calculation. I will give two cases in illustration.

Case IV.—*Stricture of the urethra. Dysury. Mechanical dilatation.*—A man named Devoisse, aged 61, came to the hospital on the 19th of February, 1827, complaining of difficulty in passing his water, which had commenced two years previously. He had contracted a gonorrhœal affection sixteen years before, and the discharge had continued ever since to the time of his entering the hospital; the difficulty in making water had gradually increased, and the urine now came away a drop at a time, and with considerable effort; the secretion from the urethra was large. He took some baths; the urine was carefully examined, but it deposited no sediment; the patient said that it was supposed there was stricture of the urethra.

On the 23d of February, a bougie was introduced into the passage, and was arrested in front of the membranous portion; soon after, by gentle pressure, the small extremity penetrated the obstruction, and, although grasped by it, the instrument was pressed onward, and thus effected a purely mechanical dilatation of the stricture. This bougie remained in for four-and-twenty hours, when it was replaced by an india-rubber catheter of small size; the scrotum was supported, and the dilatation was persevered in for thirty-nine days; five catheters were used, of increasing calibre, the last being one of the largest size; the whole of the urine passed between it and the parietes of the passage. It was removed on the thirty-ninth day (4th of April); the jet of urine was free and large; and no accident whatever occurred during the treatment.

Case V.—*Stricture at the bulb of the urethra, treated by mechanical dilatation.*—Pino, aged 42, of good constitution, entered the Hôtel-Dieu on the 28th of February, 1827. He was suffering from difficulty in making water, of which he had felt the first symptoms ten years previously, succeeding two attacks of gonorrhœa; the first, contracted when he was 20, lasted three months, and was suppressed by a drastic purge; the second, two years afterwards, still continued. A white, opaque, mucous discharge came away on pressure of the urethra, which had persisted for twenty-two years, and was probably the cause of the stricture. However this may be, the dysury commenced with a smarting sensation, and a feeling of contraction of the urethra, at the time of making water; the stream gradually diminished, became crooked, and at last came away only by drops, especially after he had been drinking spirits. The dysury had greatly increased during the three months preceding his admission into the hospital; great exertion, and sometimes traction of the penis, were necessary to promote emission of the urine, which at other times came away involuntarily, by a sort of overflowing. On the 1st of March, a bougie was introduced into the canal; towards the end of the bulbous portion it entered a firm stricture, and was so grasped by it, that sufficient force was used to raise up the penis without withdrawing it; the bougie was fixed at this point, and eight hours afterwards it passed, with very moderate pressure, into the bladder. On the 4th of March, an elastic catheter, of medium size, was placed in the passage; after which, other larger ones were introduced and left in the urethra. In twenty-two days the patient passed his water freely, and in a considerable stream.

I will conclude this subject with some remarks applicable to the different modes of treatment by dilatation.

In the course of ten to twelve days, at the utmost, you may pass from the smallest bougie to a catheter of the largest size; or, in other words, the most firm stricture may be dilated to the fullest extent, by a daily augmentation of the size of the catheters.

But the dilatation is less persistent in proportion to the rapidity with which it is accomplished; whence it follows that, instead of hastening the process, it should rather be retarded; for the dilatation is the more lasting when it has been obtained gradually.

Rapid dilatation of strictures of the urethra is subject also to other more serious consequences, such as very acute pain, laceration at the point of contraction, acute inflammation, gangrene, and a greater or less destruction of the canal,—accidents which are also seen to occur when force is used in passing the catheter. It would appear that the tissues which compose these strictures, as all other animal tissues, are extensible to a certain point, beyond which you cannot pass without danger of laceration, but are susceptible of almost indefinite extension, if proceeded with gently and in a gradual manner.

Whatever precautions, however, may be used in dilating strictures of the urethra, the cure in the great majority of cases is only temporary, and the stricture has always a great tendency to return. Dilatation does not destroy strictures, nor does it alter the nature of the tissues of which they are composed; it merely extends them. After this mechanical dilatation, there succeeds, sooner or later, a vital re-contraction which brings back the parts to their previous state.

This effect is produced sooner with some than with others. The return of the disease has induced me to pass a bougie occasionally, say every ten, twelve, fifteen, or twenty days, leaving the bougie in the urethra for two, four, or six hours, or even during a whole night. This has materially retarded, if not prevented the recurrence of the complaint.

But, whether it take place in spite of every precaution, or because it has been neglected, this recurrence is one of the most serious evils attending the treatment of strictures by dilatation. I have therefore been induced to try whether cautery would not prevent the return of strictures of the urethra, and experience has been rather in favour of it; but many surgeons are still satisfied with the process of dilatation.

SECTION XII.

ON HYDROCELE, AND ITS PRINCIPAL VARIETIES.

Nothing is easier than the diagnosis of simple hydrocele, nothing more simple than its treatment; therefore, I should not dwell long on this disease, were it not that the varieties and complications which sometimes present themselves are deserving of attention. It is familiar to all that the name of hydrocele is given to aqueous tumours of the scrotum, and that these tumours are of two kinds; in one the water is diffused through the cells of the cellular tissue; this is hydrocele by infiltration: in the other, it is collected in a sac, which is circumscribed hydrocele of the tunica vaginalis. In practice, a third kind is also met with, which is distinguished from the others by the fluid being accumulated in accidental serous cavities, developed either in the middle of the cord, in the body of the testicle, or in the epididymis. In making this classification, I should state that each kind may offer many varieties, of which I will mention the specific characters.

Having pointed out these divisions, I will say a few words about hydrocele by infiltration; but, in the first place, I would direct attention to the characteristics of the principal varieties of cellular tissue which are met with, for this is an important consideration as associated with this form of hydrocele.

I recognize four varieties in the cellular tissue: 1st. The fatty cellular tissue, which exists almost alone in certain animals, as, for instance, in the omentum of the sheep, and which is very abundant in some individuals. When inflammation occurs in this tissue, it almost always terminates by a sort of decay and putrefaction of the inflamed parts. This is seen in strangulated hernia, where the omentum is left in the sac, and in sheep, which are inoculated or vaccinated to preserve them from certain diseases.

2d. The fibrous cellular tissue, which contains neither fat nor serum. In man, this tissue exists especially around the articulations; and the inflammation developed in it is almost always complicated with strangulation. In the dog, and some other carnivorous animals, the cellular tissue is nearly all fibrous.

3d. The elastic cellular tissue, which does not comprise any of the elements alluded to. It is seen round the tendons, which are not provided with synovial sheaths. The inflammation which affects it has a strong tendency to extend itself; as may be remarked in the palm of the hand, whence it is propagated so readily along the tendons to the fore arm, &c.

4th. The serous cellular tissue, which never contains fat, is not elastic, and is always moistened by a certain quantity of serum. It is seen particularly in the eye-lids, the genital organs, &c. The inflammation which occurs in this often ends in suppuration. It is this tissue which is the seat of hydrocele by idiopathic or symptomatic infiltration.[1]

Considered in respect of its seat, this hydrocele may be found in the spermatic cord itself, or in the deeper cellular tissue, or occupying the sub-cutaneous serous areolæ. In the first case the tumour is circumscribed, fluctuating, and confined to one of the cords; in the second it is prolonged, extending from the ring to the bottom of the scrotum, retaining the impress of the finger, and occupying only one side of the scrotum; in the third the tumour is large, and doughy, and diffuses itself rapidly over the entire scrotum, without stopping at the median line. An acquaintance with these differences is of importance; for, supposing that it is desirable to discharge the infiltrated fluid, it will be necessary in the first two cases to make incisions of some extent, whilst in the last a simple puncture in the skin will often suffice to withdraw the whole of the fluid contained in the areolæ of the sub-cutaneous cellular tissue, in consequence of the free communication that exists between them. Hydrocele, by idiopathic infiltration, occurs only in newly born infants, and in old men. It may be confined to one side, or may invade the whole scrotum. When the infiltration is accompanied by pain, redness and active swelling of the part, it is necessary to employ soothing applications.

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[1] [It need scarcely be remarked that these observations are not introduced into the translation for the sake of their histological value.—T.]

Circumscribed hydrocele of the tunica vaginalis, of which I have chiefly to treat, is fluctuating; from the bottom of the scrotum it rises towards the inguinal ring, is almost always developed in front of the testicle, and offers but little resistance, until the serous sac and the other distended tunics resist the effort of the fluid and react upon it. The most unequivocal sign of hydrocele is the transparency of the tumour; the absence of this sign almost constantly indicates, either an opaque fluid or some deep-seated alteration in the texture of the cyst. This sign may also be wanting when the testicle is in front, or directly internal or external. The weight of the hydrocele should be noticed; it is generally less than might be imagined; it is greater when the testicle is swollen, or when any solid deposit has taken place in the vaginal tunic. The fluid is usually pure serum, of a light-lemon colour; but it may be yellowish, whitish, or greenish; any other alteration of colour depends on a mixture of blood, or on decomposition.

Case I.—*Hydrocele. Puncture. Testicle in front. No fluid. Fresh puncture. Cure.*—A man came to the Hôtel-Dieu, after having been punctured for hydrocele at another hospital. The operation, he said, was very painful; blood only came away, without any serum; and the scrotum, instead of diminishing, immediately increased in size. It had become hot, painful, and distended; and it was only after severe antiphlogistic treatment that it was reduced to its previous state.

Having placed a candle behind the tumour, I found the posterior part transparent; but there was an opacity in front, towards the point where the puncture had been made, evidently occasioned by the testicle. Laying hold of this gland, in which the point of the instrument had been arrested at the first operation, I made a puncture farther back, and emptied the tunic.

Case II.—*Hydrocele. Puncture. Testicle, in front, pierced through. Injection. Cure.*—Hildebrand, aged 28, was admitted into the Hôtel-Dieu, on the 17th of March, 1816, with a double hydrocele. The form of the tumours, and their transparency, left no doubt of the nature of the affection. That on the right being the larger, I decided on operating on this, leavi the other till a future time; fearing that, in operating upon both at once, the inflammation might only take place on one side, and leave the other uncured.

The operation was performed on the 24th of May. After again satisfying myself of the transparency of the tumour, I made a puncture towards the anterior and lower part; but the testicle was there, and was pierced through by the trocar; the pain was not very acute. After disengaging the canula from it, I injected three times. The pain was very bearable, and the inflammation which supervened was moderate; no accident occurred, and the patient left the hospital on the 1st of July, thirty-four days after the operation, nearly cured.

I have already stated that this disease presents complications and varieties which require attention; thus, for example, hydrocele of the vaginal tunic may be complicated with encysted hydrocele of the spermatic cord. This kind has frequently led to errors of diagnosis; being situated very often opposite the inguinal ring, and prolonged sometimes into the canal, it very much resembles inguinal hernia, and has often been mistaken for it. When these two forms of hydrocele are distant, they may be readily distinguished. The tumour of the cord is above, and that of the serous tunic of the testicle below. When they are close together, the hydrocele of the vaginal tunic passes in front of the other. Under certain circumstances, the greatest care is necessary in ascertaining the nature of the disease. By placing the patient on his back, it will be seen that the tumour (hydrocele of the cord) which is usually rounded and circumscribed, is isolated and distinct from the intestine or omentum; to which may be added the transparency and fluctuation which these tumours invariably present. Notwithstanding, the diagnosis is at times extremely difficult; and it will be seen by the next case, that, although all the differential signs were apparent, yet I could not help entertaining some doubts as to the real nature of the disease.

CASE III.—*Encysted hydrocele of the spermatic cord.*—A boy, twelve years of age, was operated upon, in 1828, at the Hôtel-Dieu, for hydrocele of the vaginal tunic of the left side. It was treated by injection, and he went out quite cured. A few months afterwards, a small, indolent, fluctuating tumour appeared in the groin, in front of the inguinal ring; the colour of the skin was unchanged. This disease appears to have been taken for a hernia, as a truss was recommended. In spite, however, of its use, the tumour continued to increase, and the patient came to the Hôtel-Dieu for advice, in the month of October, 1829; and the following was the condition in which he was found.

Opposite the inguinal ring, he had a rounded but somewhat elongated tumour of the size of a pigeon's egg; it commenced half an inch from this region, and terminated near the epididymis. Notwithstanding its state of tension it was fluctuating, and the colour of the skin was unchanged. Coughing did not occasion any impulse which could be felt by the hand when placed on the tumour. It could be made to pass within the inguinal ring, but it was ascertained to be isolated, and was manifestly transparent. The existence of encysted hydrocele appeared, therefore, undoubted, and I determined on treating it by incision.

This operation was performed on the 13th of October, 1829. The patient lying on his back, an incision was made in the skin covering the tumour, which was done with great care, as if it had been a case of hernia. I could not act otherwise, for there were two difficulties to be avoided,—an error in the diagnosis, and the lesion of one of the constituent parts of the cord, the relation of which to the sac it was impossible to determine. The subjacent layers were successively cut through, and the cyst was at length reached,—a jet of lemon-coloured serum indicating that it had been pierced. The opening was enlarged with the bistoury and scissors; and the finger being introduced into the cyst, no communication with it was detected. Having been completely evacuated of the serum which it contained, it was filled with lint, with a view of promoting inflammation, and, consequently, the adhesion of its parietes.

No accident occurred. The lint was changed, and, in the course of a few days, a moderate amount of inflammation spread throughout the cyst, accompanied by plentiful suppuration. In twelve days the wound had cicatrized.

I have seen hundreds of cases of encysted hydrocele of the cord mistaken for hernia, and for which the patients had been told to wear trusses. In the case of one patient whom I attended, who had worn a truss as for hernia, the tumour, being continually pushed back, had risen into the inguinal canal, where it continued to extend itself, and had acquired a great size.

The uncertainty that exists as to the nature of the tumour, whatever symptoms may be present, induces me to cite some further cases.

CASE 4.—*Encysted hydrocele.*—Gallois, aged 21, of healthy, strong constitution, had a considerable tumour on the left side of the scrotum, which had existed from early childhood, and was attributed by his nurse to violent screaming; it had increased gradually as he grew up. Its peculiar heaviness, the sensation of rapid fluctuation which was perceptible when it was held in one hand and compressed by the other on the opposite side, its transparency in front of a candle, after taking care to make tense the scrotum; all these characters left no doubt as to the aqueous nature of the tumour. Taking, also, into consideration the seat of this hydrocele, which appeared to have extended itself from above downwards; its conical shape, the base rising high up towards the inguinal ring; and its isolation from the testicle, which was immediately beneath it, forming a sort of second tumour in the lower part of the scrotum, it was evident that the fluid was inclosed in a peculiar cyst or serous sac, which had been spontaneously developed in the cellular tissue of the spermatic cord. Further, the position of the latter could be easily ascertained when it was grasped at the ring and towards the testicle, either by simple tact or with the aid of a candle, which proved that it had been thrust towards the anterior and external part of the cyst, which was quite opaque at this spot. It may be suggested that there might have existed a hernia, non-congenital or with a sac peculiar to this period of life, and which, being cured, and having its communication with the peritoneum cut off, may have been the seat of this collection of water. But it is impossible to determine this point, which, moreover, is not probable. It would be needless to enter into the particulars, and to state the reasons, for preferring the method of injection in the cure of this sort of hydrocele, or to call attention to the necessity of ascertaining the position of the cord and the testicle, as we have a recent case demonstrating this, where the testicle was placed high up in front, and it was necessary to make an incision laterally and externally.

This uncertainty ought, in a manner, to indicate the mode of treatment to be adopted: injection is one of the best, the most prompt, and the most simple remedies, for encysted hydrocele. But if an error in diagnosis should lead to the injection of an irritating fluid into a hernial sac, serious consequences would ensue. Nor is this an imaginary accident; such an injection into the abdomen has not unfrequently occurred in operations for hydrocele of the vaginal tunic, where the communication with the peritoneum had been preserved. In one case, the injection was not followed by fatal inflammation; but in another it brought on peritonitis, and the patient soon died. Great caution is therefore necessary, that the life of the patient be not placed in jeopardy; and where injection is required, it should be done cautiously, by applying the fingers to the inguinal ring, with a view to interrupt the abnormal communication.

When there is the slightest doubt or uncertainty as to the nature of the disease, recourse should be had to another mode of treatment. Incision of the cyst at once removes all uneasiness in this respect, and appears to deserve the preference in most cases. I have, however, observed, in some instances, that by injecting one part, the inflammation has spread to the other, followed by the formation of an abscess, and the consequent adhesion of the parietes. In such case, one operation may effect a radical cure of the two diseases; but such treatment is not always desirable.

It may also be well to call attention to the difficulty, not to say the impossibility, of precisely determining the relation which the spermatic vessels may bear to the encysted hydrocele of the cord. For this reason, when incision is resorted to, the operation should be performed slowly and cautiously.

As regards shape, hydrocele presents many important varieties. Thus the tumour, which is usually even and regular in form, is sometimes contracted in the centre, presenting a double sac, with a communication between the two.

CASE V.—*Hydrocele with hour-glass contraction.*—In 1824, a man came to the Hôtel-Dieu, with this singular affection. A portion of the tumour occupied the scrotum, whilst the other part was within the abdomen, and spread itself above the ring, which latter was the seat of constriction in the centre. When the patient stood up, the visible portion of the tumour filled, and when he coughed, it became distended; but it emptied itself, on the other hand, when he was in a horizontal position, or when it was pressed. Under the latter circumstances, the abdominal portion of the tumour, and the right iliac region, became raised and distended. The transparency of the external tumour, and its mode of development, were characteristic of hydrocele, in which the vaginal tunic had extended itself upwards towards the ring, on passing which it had again expanded in the abdomen.

In the interior of simple hydroceles, chambers sometimes exist, and a sort of cellular arrangement obtains by which the fluid is retained, so that when a puncture is made, a very small portion of the extravasated fluid escapes; and it is necessary to puncture each separate division before the tumour can be thoroughly emptied. In cases of this sort, which are analogous to that which I have observed in hernial sacs, and which I have called multilocular, incision is preferable, as in the preceding case, to any other mode of treatment; but even this rule is not unexceptional, as will be seen by the following example.

Case VI.—*Multilocular hydrocele. Double puncture. Cure.* —Early in May, 1833, a man came to the Hôtel-Dieu, with a tumour in the left side of the scrotum. A year and a half before he had received a blow on the testicle, from which time it began to swell unequally. When I examined it the tumour was uneven, fluctuating and transparent. As I attributed this unevenness to the resistance of the vaginal tunic, I plunged the trocar into the largest part of the tumour; some yellowish serum came away, but the tumour did not subside, and did not appear to be half emptied. On touching the part that was full, I detected distinct fluctuation; I might have passed the trocar across, but this would have given some trouble, therefore, I preferred making a second puncture. There was a copious discharge of a cloudy fluid, and the left side of the scrotum then subsided to its usual size. The first discharge, when heated, coagulated readily, but the second remained unaltered; on examination, however, in the laboratory, it was found that the latter fluid was strongly albuminous. The spermatic cord was in the same state as that on the other side, and showed no indication of extravasation.

This case appears to me deserving of great attention; for it sometimes happens that hydroceles, which have been considered as multilocular, have proved to be hydroceles of the vaginal tunic, complicated with encysted hydrocele of the cord. Dr. Loir, on the 19th February, 1830, exhibited a dissection which can leave no doubt on this point. In fact, the spermatic cord was distended with fluid; or, in other words, the hydrocele of the cord floated in the lemon-coloured serum which filled the vaginal tunic, and formed the base of the tumour: this, therefore, consisted of two distinct hydroceles, but which were very difficult to distinguish from each other. If it is proved by experience that the complication of these two hydroceles may sometimes be mistaken for a multilocular hydrocele, observation has equally demonstrated the existence of hydrocele, the sac of which could not be thoroughly emptied by a simple puncture, owing to a multiplicity of chambers, and a sort of cellular structure in which the fluid was retained.

Hydrocele of the vaginal tunic presents marked differences, when occurring in adults, or when it is congenital. It is well known that in the immature fœtus the testicle is within the abdomen, and that it very often does not descend till after birth. The peritoneal prolongation which accompanies it, and which forms the vaginal tunic at a later period, is usually closed a short time after its descent; but previously to this taking place, it may happen that serum may pass down from the abdomen. This gives rise to a hydrocele which is called congenital, and which disappears on pressure, the fluid returning into the abdomen.

I have ascertained that this species of hydrocele may occur when the testicle is still within the abdomen, and behind the internal ring. The mechanism of its formation may be easily comprehended. The peritoneal prolongation which forms the vaginal envelope of the testicle, and which corresponds with the abdominal aperture of the inguinal canal, being pressed either by the fluid contained in the abdomen, or by the intestines or omentum, insensibly yields to the pressure, becomes elongated, and forced into the passage by which the testicle passes and descends to the bottom of the scrotum. A fluctuating, translucid, soft, pyriform tumour, is then observed in this sac, which disappears almost entirely on pressure, or in a horizontal posture, but which reappears, as before, when left to itself a few moments, after the patient has assumed an upright position. I have also seen a second variety of congenital hydrocele, which is characterised by the same elongation of the peritoneum that is hereafter to form the vaginal tunic; whilst the testicle, which has already descended into the inguinal canal, is approaching the completion of its exit by the external ring.

The body of the tumour, in these two varieties of hydrocele, is covered only by the integuments of the scrotum, by the subjacent cellular tissue, or by the cellulo-fibrous lamina of the *fascia superficialis*. The upper part is entangled in the external ring, and the testicle is found adhering to the posterior part of its neck, as it would be at the bottom of the vaginal tunic. The abdominal orifice of the hydrocele communicates with the peritoneal cavity by a small opening.

These two varieties should be considered with great care, as they might be mistaken for hernia, which is in the same way developed from above downwards.

Amongst the diseases which are frequently found in connexion with hydrocele, hernia should not be omitted, especially amongst old people. Hydrocele commonly appears in front of hernia; it very seldom passes behind. Some surgeons recommend, in such cases, to leave intact the vaginal tunic, and to open only the hernial sac. Experience has proved to me that this is inexpedient, as the results of such a proceeding are obstinate inflammation and other accidents, which might have been avoided by opening at the same time the serous tunic of the testicle. By the last-mentioned treatment the strangulation is relieved, and a radical cure of the hydrocele is accomplished.

When the hydrocele is situated in front of the hernia, it sometimes happens that a portion of the omentum or intestine passes through the areolæ of the tissue which envelopes the vaginal tunic, and finds its way into the mi forming the hydrocele. These secondary tumours are covered by the hernial sac, and also by the serous investment of the testicle. In six cases of this sort, which have come under my observation, I have twice seen symptoms of strangulation depending on the constriction of the contents of the sac, at the point where they were engaged in the serous sac of the testicle. In such cases the hernia was soft and insensible at its upper part, whilst below, on a level with the hydrocele, it became tense and sensitive, and manifested all the symptoms of strangulation. It became, therefore, necessary to lay open the vaginal tunic distended with serum, which was detected by the discharge of the fluid, by the immediate presence of the testicle, and by the absence of a superior opening towards the ring. The prominence of the secondary hernia was then perceptible; and having opened the hernial sac, the aperture through which the viscera passed into the cavity of the vaginal tunic was relieved, and, without touching the ring, the parts were easily reduced. In no case have I seen the vaginal tunic project into, and become entangled in, the hernial sac.

As the hydrocele may be covered partially or entirely by a hernial sac, more or less filled with omentum, great care must be taken, when a puncture is made, not to prick the hernial sac or the testicle. It is very important, in such a case, to be well acquainted with the relative position of the two sacs, which is far from being always the same; thus, although in some cases the hydrocele forms the most posterior and inferior portion of the entire swelling, frequently the aqueous tumour is placed in front and to the outer side of the hernia. Under other circumstances, the vaginal tunic penetrates into the hydrocele,[1] and forms a true aqueous hernia in its cavity. The reverse may also occur, when the vaginal tunic gives way at some point corresponding with the hernial sac, and a rent is formed through which a portion of the hernia protrudes. The resistance and elasticity of the edges of this laceration, as well as its narrowness, are such, that the parts which constitute this sort of hernia are frequently found to be irritated, contused and compressed in their passage, exhibiting all the symptoms of strangulation, which is attributed, although incorrectly, to stricture at the ring.

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[1] [This passage has been literally rendered: the context and sense would appear to require that "hernial sac" should be substituted for "hydrocele;" and yet, this would be inconsistent with the remark at the conclusion of the last paragraph.—T.]

I have seen several such cases. It is very necessary to be acquainted with them, and to bear them in mind when operating for hydrocele and strangulated hernia, in order to avoid plunging the trocar into a hernial sac, or cutting through the envelopes of a hydrocele for those of a hernia, or attempting to relieve the constriction at the ring, when the strangulation is really produced by the contraction of the lacerated opening in the vaginal tunic on the parts which have penetrated into its cavity.

Amongst other complications, we must not omit sarcocele, of which the following is an interesting case.

CASE VII.—*Hydro-sarcocele: extraordinary case as regards the difficulty of the diagnosis.*—A short time back a naval physician came to consult me for an affection of the left testicle. It had been considered a hydro-sarcocele by some of our profession, who had examined it. The following are the circumstances: The left testicle had never descended into the scrotum. A tumour of variable size frequently appeared along the course of the spermatic cord, descended more or less, at times even to the scrotum, and afterwards rose again gradually, disappearing at the inguinal ring. At length it became stationary without the abdomen. It was supposed to be hernia, and the patient from his youth had constantly worn a truss. Now, observe this fact, for it no doubt materially influenced the subsequent modifications of the organs. It may be admitted as a principle, that when a truss is unnecessary it is almost always injurious, by exercising constant, sustained pressure, the effects of which are nearly at all times bad; it has not unfrequently been known to give rise to swellings of a scirrhous nature. For some years, however, the patient had discontinued wearing it, and he was now thirty-two years of age. Another circumstance, also to be taken into account, is the frequent variation in the size of the tumour. During a long voyage, which he had been compelled to take a year ago, it increased considerably; and, on his return, fluctuation was detected at the anterior and inferior portion; and above and behind this fluctuation there was a hard substance. The first time I saw the patient, I thought there was a collection of fluid; but it was difficult, taking into account the antecedent circumstances, to determine what organ was the seat of the hard substance to which I have alluded. I inclined to think that it was a swelling formed by a hernia with adhesions; and I confined myself to recommending rest, baths and topical emollients, and afterwards endeavouring to reduce it, but I met with no success.

The patient, who was again on the eve of another long voyage, was desirous of getting quit of the affection at any cost. It was a most embarrassing situation for an operator. There was undoubtedly a collection of fluid, but with this all certainty was at an end, and beyond was nothing but doubt and obscurity. In the first place, it is often very difficult to distinguish sarcocele from hydrocele, complicated with cartilaginous thickening of the vaginal tunic; but further, I had to ascertain whether this hydrocele existed alone, or whether it was accompanied by sarcocele, by congestive swelling of the testicle, or by hernia, and whether this hernia had contracted any adhesions or not; for either of these hypotheses might prove correct. We daily meet with this sort of complications, and we must regulate our proceedings in accordance with the results which we observe. I thought at first of making an exploring puncture, but I had still to decide on the mode of doing this. The use of the trocar, which is harmless, and an appropriate instrument in a case of simple hydrocele, would have been very dangerous, if the tumour should prove to be simple swelling of the testicle, without actual disease, or to result from the presence of intestine. In either case, there would be great risk of injuring one or other of these organs. Further, if sarcocele existed, puncturing would be useless.

I determined, on these considerations, to open the tumour with a bistoury. I made an incision, about an inch long, in the lower part of the integuments, and prolonged it a little obliquely backwards, carrying it gradually and carefully down to the sac containing the fluid, which presented a blueish tint, and was resisting. Having punctured it with the point of the bistoury, some serum escaped exactly like that which occurs in simple hydrocele. With the view of preventing the infiltration of this fluid into the cellular tissue, I enlarged the incision; the quantity discharged may have amounted to eight or ten ounces. The tumour was thus diminished to about one third of its former size. It was then quite evident that the remainder of the tumour—the hard substance of which I have spoken—was formed by the testicle itself; but it remained to ascertain in what condition it was, and whether the swelling was due to a venereal affection, to scrofula, or rather to some external cause. In reply to questions put to the patient, it appeared that he had only once had gonorrhœa, which lasted five or six days. Although he had some slight symptoms of scrofula, yet they were not sufficient to warrant the belief that the disease was due to it. The patient was of good constitution, and had otherwise always enjoyed good health. Everything, therefore, combined to make me believe that the tumour had arisen from pressure on the testicle by the truss, which he had worn for many years for the supposed hernia. Finally, in case it might have arisen from venereal affection, would it have been right to limit the operation to what had already been done, and to treat the disease by antisyphilitic remedies? This must have depended in great measure on the knowledge to be acquired of the condition of the testicle; whereas, the circumstances already enumerated only served to assist me in forming an opinion as to the propriety of removing the organ.

Having carefully examined the testicle, I found several knotty prominences and inequalities on its surface; it was hard and almost insensible, and the hardness was most remarkable in the epididymis, which had acquired considerable size.

There were, therefore, strong reasons for believing that the testicle was in great part diseased, and I determined on removing it. But, in the first place, being desirous of ascertaining the state of the upper portion of the spermatic cord and the inguinal canal, I reached the latter without any difficulty, and found it widely open and perfectly free. This circumstance explained satisfactorily the varying size of the tumour, which was due to the occasional descent of a hernia, and its spontaneous reduction. I also discovered why the tumour which contained the fluid could not be returned into the abdomen; this was owing to the disposition of the epididymis, which occupied the entrance of the ring [illegible] been pushed up by the tumour, and thus effectually blocked this aperture. It is well known that in dogs a peritoneal fold, placed there as a kind of valve, prevents the return of injections made by the vaginal tunic. With our patient the epididymis fulfilled, abnormally, the natural function of the peritoneum in dogs.

In this peculiar condition of the ring, the operation might be attended with two accidents equally serious. A portion of the intestine might pass out of the abdomen, and become entangled in the wound, as sometimes happens in operations for strangulated hernia. Again, if hemorrhage supervened, the blood extravasated into the peritoneum might give rise to violent inflammation of this membrane. To prevent these, I took the precaution to tie the vessels of the cord with great care, and I endeavoured to do the same with the vessels of the integuments.

I will recapitulate the circumstances of this interesting case. The tumour was formed by a collection of fluid, and the abnormal size of the testicle; and, incidentally, by the hernia of an intestinal fold. The collection of fluid, which I estimated at eight to ten ounces, was produced by a morbid secretion of the vaginal tunic, and formed a true hydrocele. Although the inguinal ring was largely open, the communication of the vaginal tunic with the peritoneal cavity was not free, owing to the peculiar disposition of the lower part of this canal, and it was found impracticable to reduce the sac which contained the fluid. As regards the determination at which I arrived, to remove the testicle, it appeared to me the most prudent course. The operation, it is true, was painful, long, and difficult; but this was not to be compared with the accidents which would result from the ulterior course of the disease, or with an operation having in view an entirely different object. Moreover, an inspection of the preparation will determine whether I came to a right decision or not. The testicle, which was more than three times its natural size, being cut open with a bistoury, presented a carcinomatous condition, but in its first stage, that is to say, without degeneration or softening;—a fortunate circumstance, as the patient thereby enjoyed a better prospect of radical cure. The epididymis, at least four times its usual size, was in the same state. The general constitution of the patient, the integrity of the cord, and the presumed cause of the affection, all lead me to believe that he will be perfectly cured.

I must now briefly direct attention to several cases of less frequent occurrence, and which are less perfectly understood. Serous cysts may be developed in one side of the scrotum, which then assumes a very considerable size. In these cases scirrhous degeneration has been suspected, and the testicle has been removed; at other times these cysts appear in the midst of the organ itself. This is connected with what Morgagni calls hydatids of the testicle, and he attributes hydrocele to the rupture of these cysts. Having, he says, observed, in every case of this disease, hydatids of the testicle either entire or ruptured, or vestiges of old hydatids, he considered himself bound to conclude that the rupture of these hydatids was the most general, if not the sole, cause of hydrocele. In the present state of science I shall not discuss the value of this explanation, but will merely observe that an hydatid cyst, developed in the body of the cord, or in one side of the scrotum, may, from its softness, its elasticity, its greater or less transparency, and other characters, lead to the belief in the existence of hydrocele of the cord or of the vaginal tunic. They are more easily confounded with hydrocele, when the cavity is separated into chambers. I have seen several individuals of the same family affected with this strange disease, and I cured them all by incision of the cyst.

Purulent or melicerous cysts, scrofulous disease, and other results of chronic inflammation of the testicles, which have been sometimes called encysted hydrocele of this organ, are morbid changes wholly different from that now under consideration. These or other purulent collections require either incision of their parietes, or extirpation of the organ which incloses them.

The texture of the vaginal tunic undergoes various stages of disorganization, which it may not be unprofitable to examine. At the commencement of the disease, it is thin, transparent, and easily cut through. At a later period, when the affection is of old standing, this envelope, or rather the cellular tissue of its external surface, frequently acquires great thickness, and a consistency almost resembling cartilage. It is then seldom transparent; and after puncture, the tunic, instead of collapsing, remains like a shell around the organ. At times I have seen this serous sac become the seat of sanguineous extravasation, more or less abundant, or present osseous plates of variable size. The three following cases will give some idea of these alterations of the vaginal tunic, and of the difficulties which such cases create in practice.

Case VIII.—*Hydrocele. Cartilaginous degeneration of the vaginal tunic. Bloody extravasation.*—An old man came to the Hôtel-Dieu, in 1815, having a tumour in the scrotum larger than the two fists. This tumour fluctuated sensibly in front, and behind it presented two very hard tubercles; it could be easily isolated from the ring, and was considered to be a hydrocele, or a hydro-sarcocele: the patient having died from weakness, the parts were examined. Beneath the skin and the dartos was a very thick fibrous expansion, covering a cartilaginous membrane which was the vaginal tunic; it was carefully opened, and there came away immediately a large quantity of fluid of the colour of wine-lees, a portion remaining behind of the same colour, without consistence or cohesion, which proved to be decomposed blood. On splitting the cartilaginous membrane in various directions, it was found to be half a line thick; and attached to it was the testicle, converted into a thin plate, and forming a portion of its parietes. The two small tubercles which had been felt, were formed by a circumscribed thickening of the cartilage, the centre of which was osseous.

Case IX.—*Hydrocele. Cartilaginous degeneration of the vaginal tunic.*—During the year 1820, Ch——, of Lille, aged about 40, came to me, having in the scrotum a rounded, uneven, hard, resisting, opaque tumour, the size of which might be equal to the fist of a child ten or twelve years old, and which, uniting with the testicle, was, like this organ, movable and suspended by the cord. These signs might equally lead to the suspicion of a hydrocele complicated with cartilaginous degeneration of the vaginal tunic, of a sarcocele, or of a hydro-sarcocele. Such was the condition of the affected parts; and had it been necessary to determine the nature of the disease upon mere inspection, it may be easily imagined into what a state of irresolution the surgeon might have been thrown.

This difficulty, however, did not occur, as the information obtained from the patient solved the question at once.

The disease had commenced twenty-two years previously, at an age when carcinomatous degeneration rarely occurs; it was not painful, but only inconvenient from its weight; finally, puncturing had been several times unsuccessfully tried, both with and without injections; and every time the sac was emptied it was observed that the testicle was healthy, but that the tunic was gradually becoming thicker and harder.

After these details it was impossible to be deceived; the patient was affected with hydrocele, complicated with cartilaginous degeneration of the vaginal membrane. Excision was the only course to be adopted. On cutting into the cyst, a small quantity of lemon-coloured, transparent serum was discharged. The cavity of this sort of cartilaginous shell into which the membrane had been transformed, and of which the parietes were at least four or five lines thick, was divided by fibrinous productions, the rudiments of partitions which might hereafter have become more organized, and have separated the principal cavity into several secondary chambers. The patient was completely cured in a month.

Case X.—*Hydrocele with cartilaginous degeneration of the vaginal tunic. Sanguineous extravasation.*—D——, of St. Domingo, a man of colour, aged about 40, having seriously bruised his right testicle, had for several years suffered violent pain, and perceived that it gradually increased in size. He determined on coming to Paris, and on his arrival the testicle was hard, heavy and uneven; and, besides being very sensitive at all times, it was occasionally the seat of those shooting pains, which are considered as characteristic of carcinomatous degeneration. I pronounced that he had sarcocele, and proposed extirpation, which was almost immediately carried into effect. Having laid bare the organ by an incision, and discovered a fluctuating point at its surface, for greater surety I plunged the point of the bistoury into it, and there came away a jet of reddish, inodorous fluid, analogous to that which is often found in degenerated tumours; I had therefore no further doubt, and the extirpation was completed. The tumour was then examined. It was found to be entirely formed by vaginal tunic, which had become cartilaginous and of unequal thickness. The cavity into which the puncture had been made during the operation, was its own proper cavity, and the fluid which had been discharged owed its quality and colour to the mixture of a certain quantity of blood; the latter proceeded from a perfectly round, regular and even aperture, the edges of which were smooth and about two lines in diameter, which was situated at the posterior and inferior portion of the sac, and implicated both the vaginal tunic and the tunica albuginea. Through this opening the substance of the testicle itself was seen, and this was found to be healthy; so that, although the exact nature of the disease had not been at first detected, there was no reason for regretting the proceeding which had been adopted.

The most usual mode of cure, in hydrocele, is by injection; but I have been successful in the application of a blister to the scrotum. It excites an irritation which extends to the vaginal tunic, and induces absorption of the fluid contained in this membrane, as well as the reciprocal adhesion of its adjoining surfaces. This occurred in the following case.

Case XI.—*Hydrocele cured by the application of a blister.*—J. A. Lobré, a confectioner, aged 19, came to the Hôtel-Dieu, on the 28th of January, 1826, suffering from hydrocele of the vaginal tunic on the right side. It had commenced five or six years previously, without assignable cause, and had since increased very slowly. It was pyriform, rather tense, and of middling size; its transparency was manifest, it was unattended by pain, and was not accompanied by any enlargement of the cord. The young man was of sanguine temperament, of excellent constitution, and in good health. It was decided to operate by injection; and on the 1st of February, everything being ready, a trocar was plunged into the tumour. There was some difficulty in introducing the instrument, and considerable impulsive force was necessary, which appeared to arise from the canula not being very exactly fitted to the circumference of the blade towards its extremity. It seemed that the canula, after having passed through the scrotum, had momentarily pushed before it the vaginal tunic; but having at length pierced it, the trocar, following the greater impulse given to it, had imbedded itself in an opposite part of the cavity of the vaginal tunic. The blade of the trocar being withdrawn, it became necessary slightly to withdraw the canula also, to admit of the discharge of the serum. The quantity that came away was by no means proportionate to the size of the hydrocele, because the testicle was enlarged, and thus increased the dimensions of the tumour. It was besides insensible.

It had been at first proposed to operate by injection; but as the circumstances mentioned as attending the puncture occasioned some apprehension that the wine injected might infiltrate into the adjoining cellular tissue, I thought it best to desist; but I did not give up the hope of completely curing the hydrocele. I had recourse, therefore, to a large blister applied over the whole surface of the scrotum, and this was put on the same day. On the following day the blister had risen, and there was swelling similar to that which follows the operation by injection. It was thought proper to keep up and increase the irritation on the surface of the scrotum, and the part was dressed with blistering ointment. On the third day, suppuration was established; the swelling had increased, and it was at least as large now as it was before the evacuation of the fluid; this appeared to be partly the result of swelling of the scrotal cellular tissue, partly of extravasation of the fluid in the vaginal cavity, and partly of the enlargement of the testicle itself. On the fourth day, the appearances were the same; the suppuration was abundant, and throughout the surface of the scrotum.

During this time the patient had suffered considerable pain at the neck of the bladder, as well as some fever and tenesmus, accompanied by difficulty in passing his water; these symptoms, however, subsided, and did not last long. The suppuration of the blistered surface was kept up till the 10th of February, at which period the dressing was weakened by a mixture of simple cerate, the blistering ointment being diminished daily. The suppuration then decreased, and by the 16th or 17th of February the blister had quite dried up. At this period the swelling had diminished by one half, and that which remained appeared to proceed from enlargement of the testicle, and from the presence of fluid in the vaginal tunic, which was detected by obscure fluctuation.

The swelling of the testicle was considered as the result only of the inflammation intentionally promoted, and which was requisite to encourage the adhesion of the opposed surfaces of the vaginal tunic. But the presence of fluid at this advanced period of treatment created apprehension that it might prove an obstacle to a radical cure; it was hoped, however, that it would soon be entirely absorbed. The scrotum was kept covered with dressings steeped in discutient lotions. On the 27th of February he asked to be discharged, and at this period there was no longer any sign of fluctuation; the fluid had apparently been wholly absorbed, and the only remnant of the inflammation occasioned by the blister, was some degree of enlargement of the testicle, which had, however, diminished considerably since the blister had dried up. The surrounding parts had regained their natural state; adhesions had probably taken place between the surface of the testicle and that of the vaginal tunic, and there was every reason to hope that the patient would be cured of the hydrocele.

The materials for injections should be selected with discrimination; the following I have found most useful. Boil two ounces of Provence roses in a pint of strong Roussillon wine, the strength of which may sometimes be augmented by the addition of a few spoonfuls of brandy. I make three successive injections, each of three minutes' duration. The only precaution I invariably adopt, is to observe carefully, before each injection, that the canula has not been withdrawn from the cavity of the vaginal tunic. If a lateral movement of the mouth of the canula is accompanied by a free movement of the opposite extremity, the injection may be made without apprehension; but if, on the other hand, these movements are confined and limited, it is probable that, from the retraction of the parts, the vaginal tunic may have withdrawn itself from the canula, and left it in the cellular tissue; the injection must not then be made till the tube shall have been properly replaced. By neglect of this precaution, it sometimes happens that the injected fluid passes into the cellular tissue instead of entering the vaginal tunic, as we shall see presently. The introduction of an injection may give rise to nervous symptoms, spasms and convulsions. The inflammation which ensues is frequently very violent, but it is confined to the vaginal tunic and the skin; it is very rare to see it followed by abscesses in the testicle. M. Pelletan once saw tetanus ensue after the operation for hydrocele by injection.

CASE XII.—*Hydrocele treated by puncture. The fluid introduced into the cellular tissue.*—A person suffering from hydrocele went to an hospital for advice. The fluid was drawn off, but the injection, instead of being thrown into the vaginal tunic, was retained in the cellular tissue; very severe inflammation followed, and it was with great difficulty subdued. The extravasation having returned, the patient came, in 1833, to the Hôtel-Dieu. I determined on operating by incision. After four and twenty hours the patient was seized with nausea, and a short time afterwards hemorrhage took place, which was twice repeated. I took off the dressing, washed the wound, and covered it with cloths dipped in cold water; I abstained from plugging the wound, because the blood came from the inguinal ring. Every one knows that in Germany, in extensive hemorrhages, they expose the parts to the air and bathe them with cold water. This treatment is not suitable where the bleeding proceeds from large vessels, as the ligature is a much more certain method of arresting it; but in hemorrhage from small vessels, accompanied by inflammatory symptoms, it is proper. This was the case with the patient in question; the bleeding occurred during the period of inflammation, and did not return. It would have been far otherwise if I had attempted to stop it by pressure. A man whose thigh had been amputated, received a blow on the stump, which made it bleed. I took off the dressings, and found the surface of the wound grey, but I could not discover the bleeding vessel. I used pressure, which was followed by pain, and the bleeding recurred. I again took off the dressings, and both ceased. I renewed the dressings twice, and each time the bleeding recommenced. It was manifest that the dressings excited tension of the parts, and thence hemorrhage, (the form which I have denominated hemorrhage from irritation); I did not apply them again. I have since had occasion to observe capillary hemorrhages produced by irritation, which generally ceased on throwing aside the dressings. Such forms of hemorrhage must be treated medically, [illegible] cold water applications, and the removal of all irritating appliances.

Injection of the tunica vaginalis is very often accompanied by pain, but it may happen that this symptom is absent. M. Cruveilhier has given two cases which quite prove this. The first related to a man, aged 52, who had hydrocele on the right side. By the advice of a physician, the part was subjected to the vapour of a solution of elder-flowers, poppies, and some other ingredients. The effect of this remedy was so rapid, according to the patient's report, that the testicle was reduced nearly to its natural size in the course of seven or eight days. A month after this marvellous cure, he was attacked by a sharp pain in the chest, which was subdued by blisters and antispasmodic draughts. From this time the testicle appeared to the patient larger than its natural size, but it remained stationary till the 1st of March, 1813, at which period the hydrocele returned, and soon reached the same size as on the first occasion. When examined, the tumour was remarkable for its great weight. After the patient had been prepared the sac was tapped, and two injections were made without causing any pain. Its absence would have appeared a bad sign to many practitioners, but experience has proved to me that pain is not a necessary condition to the success of the operation, and that the necessary amount of irritation may still be produced. The result of this operation was in no way peculiar, and the patient went out cured.

The second person was also treated by puncture, without suffering any pain, and he was cured in the same way.

M. Lisfranc has also given two cases of injection without pain; and he is of opinion that nothing can be concluded, as to the success or otherwise of the operation, by the presence or absence of pain. It depends entirely on the idiosyncrasy of the patients.

The passage of the fluid into the cellular tissue may also lead to gangrene of the scrotum. Such accidents, which are ascribed to the process of injection, depend altogether on the manner of operating.

Injection is the proceeding most commonly adopted; and although it succeeds in ninety-nine cases out of a hundred, I have seen it fail six or seven times in the course of my practice.

It is not, however, the only means used, for there are cases which require different treatment. Thus, when the cavity of the vaginal tunic is divided into several cells, which is detected by the unevenness of the surface of the tumour, by the transparency of these prominences and the opacity of the intervening spaces, and also by a peculiar obscurity in the fluctuation, it is evident that an incision opening all the cells at once is preferable to repeated injections; and incision must also be resorted to, if it be discovered, after puncturing, that this condition exists, which may be known by the small quantity of fluid discharged.

If the disease be of old standing, if the tumour be opaque, hard, and of small volume, it may be considered that the vaginal tunic has assumed a cartilaginous structure, in which case excision is necessary. I perform this operation as follows: I grasp the whole tumour with the left hand, so as to stretch the anterior parietes as much as possible; I then regulate my incision according as it may be necessary or not to remove a portion of the integuments; next I press out the vaginal tunic, as one would squeeze out the stone from a plum. I finally open the cyst and cut it away. The wound is then filled with soft lint, and the dressing is precisely the same as in cases of incision.

The treatment of hydrocele in children presents some peculiarities, which I will mention. In congenital hydrocele it has been recommended to return the water into the abdomen by gradual pressure, and to keep it there by means of a truss, the pad being placed exactly on the ring. Nature closes the aperture of the prolongation of the peritoneum which forms the vaginal tunic, just as would have happened if no obstacle had been interposed; and the patient is relieved from all inconvenience. This method, which was introduced by Viguerie, may be dangerous and lead to mischief, when the testicle is still within the abdomen or in the inguinal passage.

Cold baths have been beneficial in these cases, corrugating the parts, and causing a portion of the vaginal tunic to retract: blisters applied to the swelling have, in some cases, induced absorption of the extravasated fluid, and adhesion of the parietes of the sac which contained it. These modes of treatment have the immense advantage [illegible] ng the hydrocele, whilst there is no pressure on the testicle, which may descend freely. When an operation must be resorted to, a correct knowledge of the varieties which may occur, in the disposition of the parts, is very useful; the surgeon may then modify his operation, so as to spare the patient from unnecessary danger, and make it at the same time more efficacious in the cure of the disease.

Before injecting, in cases of congenital hydrocele, it is necessary to be well assured that the testicle has descended, and that the sac does not contain any portion of intestine or omentum. An assistant should apply pressure on the top of the hydrocele, at the termination of the inguinal canal, so as to bring the parietes together. Then the operator, after evacuating the sac by means of the trocar, may proceed to inject in the usual way, the assistant preventing the injected fluid from rising too high up. When the operation is finished, a padded truss, such as are used in hernia, should be applied over the external ring. In this way a radical cure of the hydrocele has been obtained, as well as the separation which ought to exist between the sac containing the testicle and the abdominal cavity; and the risk of the occurrence of congenital hernia, which is a frequent complication of congenital hydrocele, is also avoided. It is manifest that, if such a complication should exist, the hernia must be returned before operating, and should be kept reduced during the whole course of treatment.

SECTION XIII.

ON A PARTICULAR SORT OF FIBRO-CELLULAR ENCYSTED TUMOUR, KNOWN BY THE NAME OF NERVOUS GANGLIONS OR TUBERCLES.

Cysts are accidental membranous productions, either organized around a foreign body, or developed prior to the contents which they enclose. Cysts formed around extravasated blood, balls, urinary calculi, &c., are examples of the former class of cysts; whilst serous, synovial, melicerous, steatomatous and gelatiniform cysts, are illustrations of the latter.

There is a third division which includes fibrous productions, characterised by a dense, white, resisting tissue, often enclosed in fibrous or fibro-cellular sacs. With this latter class the little encysted tumours, of which I am about to speak, have the closest analogy. But, in many of their characteristics, they differ essentially from all three classes, for they are fibro-cellular in structure, and rounded in form, not exceeding a pea in size, and almost always situated beneath the skin of the limbs, and terminating in cancerous degeneration.

It is difficult, at first sight, to imagine that a little tumour of the kind I refer to, and which the eye can scarcely detect, should be the seat of such acute suffering, and the nucleus of so fearful a disease as cancer; yet observation has proved such to be really the case.

Many authors have accurately described these tumours, but have believed them to be developed in the nerve tissue, or specially in the course of the nerves. Thus, A. Petit, in his discourse on pain, after speaking of the extreme sensitiveness of the extremities of nerves, remarks, that "the nervous ganglions are very little known; they exhibit themselves in the form of little bodies about the size of a bean, hard, movable, colourless; sometimes resulting from injury, at others occurring without apparent cause, and being the seat of the most excruciating pain, when touched ever so lightly: tonics are of service to relieve this suffering; extirpation alone can get rid of them. They present, on dissection, a white, tubercular structure, enveloped in fibrous membrane, usually adhering to the skin, movable in the cellular tissue, where it appears to be connected only to some nervous filaments, of which it is the expansion; a large proportion of those I have operated on were in the leg; one only occurred in the arm."

Cheselden[1] mentions having twice met with a small tumour, about the size of a pea, beneath the skin covering the tibia; that it was excessively sensitive, and regarded as cancerous; extirpation effected a cure. Camper and Chaussier speak of these little tumours in the same strain; and lastly, in 1822, M. Descot describes them under the title of *"painful" subcutaneous tumours*, and remarks that they seem to be connected only by nervous filaments to the surrounding parts, or else they are developed in the body of a nerve, the fibrils of which are distended and separated by their presence.

Thus, it will be perceived that, hitherto, authors have associated these little tumours with the nerves, and even speak of them as being connected with nervous filaments; but I can find no account of such connection having been verified by actual dissection.

Now, my own observation has led me to a different conclusion. I believe that these tumours have no connexion whatever with nerves. I have repeatedly dissected them on the dead body, and examined them, with care, after removing them from the living, with a sufficient quantity of cellular tissue around them; yet I never could discover the slightest trace of any connexion with nerves. The tissue of these cysts is evidently fibro-cellular, slightly albuminous, and assuming, after a time, the character of scirrhus.

Though these tumours usually occur in the limbs, I have likewise seen them in other parts,—as in the breast. They are found sometimes of a globular, at other times of an oblong, form, as large as a grain of wheat, a pea, or a coffee-berry; they are smooth, hard, and opaque, and rebound with considerable elasticity if dropped on a resisting surface. They are homogenous in texture, without cavity or cell, and of a fibrous, or fibro-cartilaginous, consistence. When cut across, they exhibit several concentric layers united by a dense cellular tissue, which is closest in its texture externally. A slight, crackling sound is audible on pressing the nail into its structure; it is enveloped in a dense and opaque fibro-cellular capsule, constituting a true cyst, which limits its development, and probably gives rise to the acute suffering which is experienced.

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[1] In his 'Anatomy,' where speaking of the structure of the skin.

These tumours are never inflamed, nor even reddened. The cellular tissue surrounding them is unchanged. The superjacent skin is usually healthy, unadherent, and of natural colour; occasionally, however, it is of a purple hue, and is closely attached to their surface, thus rendering them immovable. They are quite independent of the nerves, as the following case will exemplify.

Case I.—*Tubercle on the upper and outer part of the thigh. Excision and cure.*—M. Cordier, a washerwoman, aged 55, of lymphatic temperament, was admitted into the Hôtel-Dieu, in 1828, with a small tumour on the upper and outer part of the right thigh: it could scarcely be felt through the skin, and had been the seat of acute pain during the previous eighteen months. She attributed its presence to a blow she had received on the part; and the pain, which was at first trifling, afterwards became insupportable, but was never augmented by pressure. For some time no tumour was perceived; and, as the pain increased in intensity, the paroxysms were more frequent, and at shorter intervals; and it was only five months since that she had noticed the existence of a small, hard swelling, which, when pressed, felt as if pierced by a needle. Her sleep was broken by the pain, and she walked sometimes with difficulty. The part was leeched, and blisters were applied over the hip, thigh, and knee; but these only increased the suffering, and drove her to seek admittance into the Hôtel-Dieu.

At the time of her admission she could not sleep, in consequence of the severe pain, which was almost continuous, and extended from the upper and outer part of the right thigh, over the knee, leg, buttock, loins, and hypogastric region of the affected side, having for its centre of radiation the small, hard and movable tumour, which scarcely raised the skin, and was unaltered by pressure, as regards its form and size; but the slightest touch aggravated her suffering.

This tumour was readily extirpated. A small T-shaped incision sufficed to expose it; and, being drawn out from its cellular bed, it was excised by one cut of the bistoury. Instant and complete relief followed, to the great astonishment and satisfaction of the patient; and the little wound was dressed.

The tumour was, in size and shape, like a large pea; it was embedded in healthy cellular tissue; it surface presented no appearance of inflammatory action, not even redness, neither did its interior. The texture was hard, elastic, homogeneous, and whitish, without interval or cavity, easily penetrable by the nail, and enveloped in a dense, opaque cyst, to which it had no adhesions, although the latter was immediately applied to its surface, and presented a fibro-cellular appearance.

The wound healed by granulation, and the patient had no return whatever of the pain.

Case II.—*Ganglion situated on the fifth nerve. Section of a branch, without success. Excision of the body, followed by cure.*—A woman came to see me at the hospital, complaining that, for some years past, she had been the subject of acute suffering in the cheek, which had been sometimes regarded as of a rheumatic character, and at others referred to the infra-orbitar nerve. She had been bled, leeched, and blistered, without any relief. One surgeon, who was consulted, was so satisfied of the neuralgic character of the affection, that he divided the infra-orbitar branch of the fifth, just as it emerges from the foramen of that name. Instead of obtaining relief from this operation, the patient's sufferings were greatly aggravated, and she was induced to come to me. On carrying the finger over the cheek, I distinctly felt a small, hard, and movable tumour, immediately beneath the skin, which was healthy. Pressure on it caused acute pain. I extirpated this tumour, and from that moment the patient was relieved.

It is evident that if the tumour, in this case, had been developed in connexion with the nerve, or attached to it, the section of the latter ought to have relieved the pain; whereas, on the contrary, the operation only served to augment it, and the removal of the tumour accomplished a cure.

The following case is one of an analogous nature to the last.

Case III.—*Ganglion situated on the course of the infra-orbitar nerve. Error in diagnosis. Extirpation and cure.*—Monsieur ——, formerly in the army, 50 years of age, and unmarried, had been, when young, frequently the subject of venereal affections, and occasionally of slight rheumatic attacks. For the last two years he had suffered from pain in the right side of the face, extending from the malar region over the cheek, eyelids and forehead, on the same side. This suffering, which was intermittent, had increased in intensity and frequency; and had been regarded and treated as an affection of the infra-orbitar nerve. In 1828, the medical man, who communicated the case to me, saw the patient. The pain was then produced by any movement of the jaw, laughing, or passing the hand over the cheek; and when severe, lachrymation, twitching of the eyelids, and a copious flow of the saliva from the mouth, were excited. A small prominence was perceptible on the cheek, a little external to the infra-orbitar foramen; and in this situation, a small, hard, and movable tumour could be felt rolling beneath the finger: the pain occasioned by this examination was severe, extending over the whole of the right side of the face, and lasting for twenty minutes. An operation was proposed, and eagerly accepted. The tumour was readily exposed, and then excised with a pair of scissors curved on the flat. It was about the size of a pea, and presented all the characters I have noticed in the first case.

From the moment of its extirpation the patient ceased to suffer; and the wound healed kindly, leaving a scarcely perceptible cicatrix.

It is evident that there is a close analogy between these tumours and the earliest stages of cancer. Cruveilhier ascribes to them, in his 'Pathological Anatomy,' the same fibro-cellular character mingled with albumen.

Case IV.—*Ganglion situated in front of the radius, cured by extirpation.*—A woman, aged 59, came to me for advice concerning a small tumour which she had in front of the radial side of the forearm, a little above the wrist. It was tolerably movable, about the size of a large pea, very hard, and extremely sensitive. If not touched, it gave her no pain; but, if pressed the consequent pain extended from the tumour towards the trunk, and not in the direction of the fingers. It had been growing insensibly for seven years, and had been stationary during the last year. It was extirpated by a simple operation, as in the preceding cases, and proved to be of the same encysted character as the other tumours.

The slow growth of these little bodies is explained by their hardness, and the nature of their capsule. Their tendency to soften, after a varying time, is a confirmatory proof of their scirrhous character. When this process of degeneration has commenced, the disease will be reproduced in the neighbouring lymphatic ganglions, even should the original tumour be extirpated. I had one case under my care, in which this softening had begun; and though I removed the cyst, the axillary lymphatic ganglions became affected, and the disease reappeared.

Age and sex appear to exercise an influence on the development of these tumours. Thus, women are more subject to them than men; and they are most frequent between the age of thirty-five and sixty. Most of the patients ascribe them to injuries, such as blows or falls: in some instances the existing cause appears to have been a puncture.

Case V.—*Ganglion on the finger. Extirpation and cure.*—A shoemaker pricked his finger with his awl, and soon afterwards experienced acute pain in the part. A small tumour was developed at the seat of injury, growing insensibly, and, at the expiration of seven years, giving rise to increasingly severe paroxysms of pain. Caustic was applied in vain; but extirpation was entirely successful. The tubercle was small, hard, of a cartilaginous texture, and contained in a cyst.

Sometimes I have seen these tumours developed under the influence of a rheumatic affection, and disappear immediately the patient was withdrawn from the causes which had produced the primary disease.

Case VI.—*Ganglion on the great toe. Change of residence and cure.*—A medical student slept in a recess in a damp wall. After a time he became the subject of arthritis in the great toe; and this was soon succeeded by the formation of a hard tumour, the size of a grain of corn, beneath the skin, covering the internal saphena vein and nerve. Every time this was touched, a darting pain, like an electric shock, was experienced. Having changed the position of his sleeping apartment, this young man was soon cured of both neuralgia and tubercle.

In general, the occasional causes of these tumours are very obscure; and, in the larger number of cases, their presence cannot be traced to any cause whatever.

Fibrous encysted tumours are most frequently met with in the limbs, and especially the lower extremities. They have been met with on the back, scrotum, face, and neck. They rarely occur except single; and when there are more than one, each is distinct and isolated.

Generally patients experience pain in the affected part long before they notice any swelling. At an early period, the slightest friction from the clothes, or pressure on the superjacent skin, occasions lancinating pains, and these generally are regularly periodical, and partake of the same character which pertains to scirrhus. When the pain occasioned by pressure extends, like an electric shock, to a distance from the tumour, it is an indication of the proximity of a large nervous trunk, which is mechanically irritated. In some cases, however, the suffering is continuous, and therefore more trying to the patient, who is deprived of rest, and, consequently, suffers seriously in health. When these tumours exist in the lower limbs, walking becomes irksome and distressing. In some irritable subjects, the paroxysms of pain are accompanied by true convulsive spasms. I was once consulted by a young woman, in whom a small cyst in the upper and outer part of the thigh was the seat of extreme suffering, and pressure upon it induced convulsion. The tubercle was removed, and with it the pain entirely and permanently disappeared. In many instances these tumours remain insensible, even on pressure, for several years.

The pain consequent on the presence of fibro-cellular encysted tumours, which have eluded notice from their small size, has often been confounded with that occasioned by rheumatic and nervous affections, and the unfortunate patients have been accordingly tormented, without benefit, with all the appliances for these complaints. Some cases illustrative of this error in diagnosis have come under my observation. In neuralgia, it may be remarked, the pain, which is acute, extends along the whole course of the affected nerve, is more strictly intermittent in its character, and is not aggravated by pressure.

The name of "ganglion" given to these cysts, may lead to their being confused with tumours of the same name, which are met with in the sheaths of tendons, especially about the wrist; but the insensibility of the latter, their mobility with the tendons during the contraction of the muscles, and the true synovial character of their interior, constitute sufficient diagnostic distinctions whereby to identify them.

Small lipomatous or steatomatous tumours, which have undergone a cancerous degeneration, cause acute pain; but the intervals in their interior, containing a yellow lardaceous or fibrous matter, impart a very characteristic appearance to them.

Lastly, it may be possible to mistake these fibro-cellular cysts for true nervous tumours. But the latter present a cavity filled with more or less fluid contents; they also usually attain a greater development, and are found in the large nervous trunks; moreover, several are frequently found in the same individual. These are all distinctive characters of the true nervous tumours, as contrasted with the cysts under consideration.

If the encysted tumour is movable, if the skin covering it is healthy, if it is situated at a distance from important organs, such as the large vessels and nerves, if, in a word, it is subcutaneous, the prognosis may be a favorable one. But if, on the contrary, it is fixed, adherent to discoloured skin, and has begun to soften, the prognosis is unfavorable. For then, even if the tumour itself be removed, as I have already remarked, the disease reappears in the neighbouring lymphatic ganglions, and the patients soon present all the symptoms which characterise the cancerous diathesis.

Caustics have been occasionally employed to destroy these tumours; but their use hastens the softening process, without curing the disease. Sometimes, though very rarely, narcotic applications on the tumour have afforded relief, where patients have turned away with dread at the mere idea of the knife. The long-continued use of local anodynes relieved, and ultimately cured, the pain, in one elderly female under my care; the cyst, in this case, was on the inner and back part of the knee.

The operation of extirpation is simple, easy of performance, and the most effectual mode of treating these cases. If the skin should be discoloured and adherent, it should be removed with the tumour.

The following case will serve to illustrate some of the preceding remarks.

Case VII.—*Ganglion taken for a rheumatic affection. Cure by extirpation.*—M. Hareng, a married woman, aged 55, came to the Hôtel-Dieu, in October, 1828, suffering from acute pain, which came on at irregular intervals. This patient, whose constitution was good, and who had ceased to menstruate, traced her complaint to exposure to cold and wet eighteen months previously. Various local specifics for rheumatism had been tried in vain; still the suffering was unabated, and the slightest fatigue exasperated it. In this case the pain exhibited two distinct forms or characters; it was continuous, and occurred in paroxysms of increased force about four times in the twenty-four hours, lasting from a few minutes to an hour. These exacerbations might be induced by pressure or a blow on a small tumour situated on the inner and upper part of the thigh. The pain was then of a lancinating character, attended by numbness, and extending downwards towards the knee. The agony was so great as to make the patient scream out; and it appeared to her as if the flesh was being torn at the parts affected. Having detected the existence of one of these subcutaneous fibrous bodies, I removed it by a T-shaped incision without difficulty.

It was white, surrounded by adipose and healthy areolar tissue, and about the size and shape of a small filbert. Its consistence was considerable, and its elasticity caused it to bound from the ground when thrown down; it presented no trace of vessels, nor even of redness; and it possessed neither cavity nor secretion within. Its texture was fibro-cellular, with a predominance of the fibrous element, and its capsule was likewise fibrous.

The wound healed kindly, and the relief was immediate and permanent.

It is unnecessary to multiply instances of the affection we have been considering. Sufficient has been said to indicate the general characters and anatomical relations of these troublesome little tumours; and to demonstrate that they may be developed in almost any part of the body, and that their removal with the knife is the only remedy upon which any reliance can be placed.

Erratum: p. 87, l. 28, *for* disappears, *read* re-appears.

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